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THE WILDERNESS AND ITS TENANTS

THE
WILDERNESS AND ITS TENANTS

A SERIES OF

GEOGRAPHICAL AND OTHER ESSAYS

ILLUSTRATIVE OF LIFE IN A WILD COUNTRY

TOGETHER WITH

EXPERIENCES AND OBSERVATIONS

CULLED FROM THE GREAT BOOK OF NATURE

IN MANY LANDS

BY

JOHN MADDEN

IN THREE VOLUMES

VOL. III

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The Wilderness and Its Tenants.

CHAPTER XIII.

THE GREAT TERRESTRIAL RESERVOIR

OR

THE OCEAN, AND THE INHABITANTS OF THE MIGHTY DEEP.

From whence do the Waters of the Ocean proceed? The Great Atmospheric Ocean. Its Billows and Storms. Chemical Affinity between Air and Water. Chemical Characters of Water. Chemical Transformations of Matter. The Waters of the Ocean precipitated from the Atmosphere. The Conversion of Vapour into Water. The Conversion of Water into Vapour. The Water-bearing Capacity of the Winds. Atmospheric Vapour on High Mountains. Water and Electrical Phenomena. The Area of Water upon the Globe. The Ocean one Continuous Liquid Expanse. Geological Changes in the Ancient Sea. Unchangeable Nature of the Ocean in General. The Great Deeps. Area and Depth of the Abyssal Region. Result of Deep Sea Soundings. Greatest Recorded Depths. Life at Great Depths. No Depth Limit to Life in the Ocean. Deep Sea Fish. Results obtained by Dredging on Board H.M.S. *Challenger*. Reasonings from Analogy point to the Existence of Fish everywhere throughout the Ocean. No Absolutely Barren Regions in Nature. Conditions of Life at Great Depths. The Eyes of Deep Sea Fish. Their Phosphorescence. Fish brought up from Great Depths always Dead. The Pressure of Water at 2500 Fathoms. Effects of Pressure on the Wood of Trawl Beams. Temperature of the Abyssal Depths. Temperatures fall with the Depth. The Freezing-point of Sea Water. Ocean Circulation of Water caused by Variations of Temperature. Evaporation. Oceanic Currents. The Sun's Heat the Cause of every Motion. The Astronomer Herschel upon Heat as a Mode of Motion. Professor Tyndall on the Same. The Problem of a General Oceanic Circulation of Water. The Gulf Stream. Gigantic Proportions of "Ocean Rivers." Lieutenant Maury, U.S.N., on the Gulf Stream. The Tremendous Power of Running Water. The Still Cushion of Water on the Ocean Floor. The Harvests of the Sea: Lieutenant Maury upon. Nature of the Bottom in the great Deeps. Globigerina Ooze. Its Composition. Minute Shells at Enormous Depths. Lieutenant Maury on the Perfect Repose of Water on the Ocean Floor. The Building up of the Earth. The Formation of White Chalk. The Chalk Form-

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> "All the rivers run into the sea; yet the sea is not full; unto the place from whence the rivers come, thither they return again."
> *Ecclesiastes* i., 7.

THE traveller in the course of his wanderings to and fro over the surface of the earth generally finds that at the end of his career no inconsiderable proportion of his time, and a great part of the mileage of his journeyings, has been passed as an ocean-borne passenger. This is specially true of the British traveller going forth from his island home.

This work would therefore appear singularly incomplete if that greatest of all wildernesses, the wilderness of waters, with all its living wonders, were passed over in silence; especially when we remember that

Great Britain owes her pre-eminence among nations to her supremacy upon the seas. This we say in no captious spirit, or with the least desire to stir up the jealousies of foreigners: many of whom, from their continental position, rely upon their army, and not upon their navy, as we do, as their first line of defence.

With Great Britain it must ever be otherwise: her principal reliance must of necessity always be placed upon her navy; her army merely forms her second line of defence at home: but also of course constitutes the guarantee of order in India and in the internal parts of her Colonial Empire and the guardian of her foreign interests by land.

We shall perhaps be pardoned if at the very outset of this chapter we attempt to face the great question of the source from whence the waters of the ocean proceed, and again venture to invite attention to a fact which, it may be, few of us actually realize; namely that in addition to the visible ocean whose waters encircle our coasts, there is also another, far greater and mightier ocean in which the earth itself is floating, in the realms of infinite space. We refer to the invisible atmospheric ocean, upon whose floor man himself, like some species of deep-sea fauna as it were, lives and moves and has his being.

While at an as yet undetermined altitude above his head, the stupendous billows of this great aerial ocean are ceaselessly rolling like those of the terrestrial sea, bearing at the same time within their currents vast masses of water in the form of invisible vapour; which, so far as we know, replenish and maintain the actual existence of our Great Terrestrial Reservoir—the Sea. *

* According to the *Encyclopædia Britannica* something like $\frac{8}{11}$ of

The chemical affinity between these two elements—air and water (if we may, for the sake of convenience, be permitted to call them so) concerning which we desire to say a word in passing, is also not a little remarkable.

Atmospheric air, as most of us are aware, is merely a mechanical admixture of nitrogen and oxygen gases, in the proportion of about four of the former to one of the latter, by *volume* (among chemists this is usually expressed by the symbol $O + N_4$); while water is formed by the chemical combination of oxygen and hydrogen, in the proportion of two volumes of hydrogen to one of oxygen (the symbol therefore by which it is now expressed is H_2O).

The mixture, however, of hydrogen and oxygen gases does not form water; but upon the explosion or combustion of pure hydrogen gas in the air, the product is water, through the consequent instantaneous combination of the oxygen of the atmosphere with the hydrogen; the nitrogen contained in so much of the air as is thus "consumed," or converted into water, being given off in the form of pure nitrogen gas. We have allowed the word "consumed" to stand (as above) with a view to recall that great maxim (which should always be present to our minds when dealing with questions of chemistry, or other natural phenomena) —that though we may for convenience sake speak of a thing as ostensibly "consumed" (as for instance in the case of a candle that is burnt out), yet nothing is in reality consumed or destroyed in Nature: but

the whole of the water falling upon the earth, is returned directly to the ocean: the remaining $\frac{3}{4}$ falling upon the land (*Encycl. Brit.*, 9th edit., Vol. xxiv., p. 398—[Art. "Water"]).

merely transformed and reorganized into a new shape: one of the most simple and common examples of such a change being shown in the formation of water by combustion, as above indicated; whereas the candle, though an identical, is of course a far less obvious illustration, because in this case practically nothing exists, in visible form, to tell us of the change that has taken place; though in fact every atom that once was candle still exists in a new and different condition.

We trust that we shall be pardoned for embarking in these technicalities, which at first sight may perhaps appear to be far removed from anything connected with our subject, the ocean; but in reality the foregoing details involve questions of supreme and immeasurable importance to every living thing existing upon earth. It is our desire therefore, for the moment, to present the existence of the terrestrial ocean, as entirely subsidiary to that far greater though invisible atmospheric ocean, by which the earth is enveloped.

From whence does the water in the sea proceed?—It is from the atmosphere. It may be rejoined that the vapour in the atmosphere was itself drawn from the ocean, from which continuous streams of vapour are always ascending.

This is indisputable, and furnishes one of the most beautiful instances of the perpetual, self-regulating power by which the operations of Nature are carried on, uninterruptedly, throughout the ages. As a weaver's shuttle flies to and fro across the loom, so this great process of conversion of water into vapour, and of vapour back again into water, goes on for ever. But the recognition of this truth does not explain how far these processes balance each other; nor does

it in the least explain how the waters of the ocean were first evolved out of nothing. That they must originally have come from the atmosphere, in some form, there does not seem much room to doubt. The condition of the older rocks shows beyond question that they were subjected to the action of intense heat, and many of them probably assumed their present position in a more or less molten condition. It must have been long after this that the waters of the ocean flowed into the great hollow of the Abyssal Region, which the Scripture has more than once likened to "the hollow of the Creator's hand;" and that being so, it is more than probable that the same process which formed these waters (most likely that of the chemical combination of gases) is still operating, though possibly in a lesser degree. How much of the terrestrial rainfall may be due to such cause it is of course impossible to tell, nor shall we presume to hazard even a guess respecting that of which we know absolutely nothing.

What we desire to contend for is that from whatsoever source they may proceed, the supplies of water which descend from the skies to nourish the dry land, and also to maintain the sea at its present level, do undoubtedly come from the atmosphere.

If that one item, the watery vapour of the atmosphere, was to become dispersed into the realms of everlasting space, instead of being condensed and returned to the earth again in the form of rain, let us ask—What would be the result? Why, that every form of life upon the land would perish through drought; the streams and the rivers would cease to flow, and finally the ocean itself would become a dry plain of saline

matter. It may be added, that such is supposed to be very much the condition of the moon at present. The terrestrial ocean is therefore according to our view altogether dependent for its continued existence upon the atmosphere.

We have already referred to the question of the water-bearing capacity of the winds in a previous chapter, * but perhaps it may be convenient here just to mention the infinitesimal proportion which the vapour of water contained in the air bears to the volume of the whole atmosphere; for it is something so small as to seem almost inappreciable in comparison. In the volumetric analysis of air, Bloxam considers that on an average the proportion of aqueous vapour is about 1.4 per cent. † This will of course be in air taken at the earth's surface; but it must be borne in mind that the amount of watery vapour rapidly diminishes as we ascend into the atmosphere; this is conclusively shown by the condition of air at great elevations on mountain ranges, which is always found to be in an exceedingly dry state; indeed it has been asserted on what is generally held to be good authority, that very little of the vapour of the atmosphere passes much above the tops of the higher Himalayan peaks. § We think it right however to say on this head, that while we are hardly disposed to go altogether so far as that, still that there is evidence enough to show that the main volume of this vapour is confined to the lowest stratum of the atmosphere. The intense cold of the higher atmosphere is in fact, of itself *prima facie*

* See Vol. i., Chapter iv., on "Climates and Temperatures."

† *Chemistry Inorganic and Organic*, by Chas. L. Bloxam, 7th edit., p. 60, 1890. Edited by J. M. Thomson and A. G. Bloxam.

§ *Encycl. Brit.*, 9th edit., Vol xi, p. 129 (Article "Himalayas").

sufficient to precipitate vapour of water ascending there, under any conditions at present known to us: but there may be other conditions unknown to us, which may largely prevail to modify these results: such for instance as the retention of vapour in a state of intense refrigeration in the form of exceedingly minute crystals of ice, possibly in the condition of the finest films, or dust.

The presumption that this would gradually settle down towards the earth, on account of its superior specific gravity over air, is as may be; that would greatly depend upon the force and the condition and chemical composition of the higher currents in the great unknown realms of space beyond our ken.

But the fact that fine ice crystals *do* exist in large quantities in the higher atmosphere, we hold to be certain, from the fact that showers of such atoms have been seen to fall in our own country, and are reported on the authority of intelligent arctic explorers to be always falling, during still weather, in the great cold of the polar winters. The result of experiments in one case showed that the quantity thus falling in only twelve hours, represented nine tons per square mile.* There is the further fact of heavy snowstorms occurring at intervals throughout the polar winter, which shows that notwithstanding the intense cold always existing the air has still remained surcharged with vapour.

Before we pass on to other matters, we desire in connection with this question to draw attention to the enormous quantities of water which are known occasionally to be held in suspension in the atmosphere, as evidenced by the instances of the tremendous annual rainfalls which have been recorded in Burma, in Brazil, and in many

* See *The Shores of the Polar Sea*, by Dr. E. L. Moss, M.D., 1878, p. 44.

other parts of the world; as well as the occurrence of these extraordinary waterspouts, so common in America and South Africa, when incredible volumes of water fall in the course of a few hours, or even minutes, so that at times they create fearful floods, which sweep everything before them.* During our late visit to the interior of South Africa, quite a number of these rain-bursts were reported as occurring in different parts of the country within a few days of each other, and in some instances considerable damage was done: roads, loaded waggons, etc., being swept away completely.

Now the existence of all this water in some form of atmospheric vapour presupposes, as we conceive, a much greater amount being held in suspension by the air than is indicated by 1 or 2 per cent. of vapour, in the lowest stratum of say the first 10,000 feet above the earth; while a second stratum of similar magnitude, reaching to the altitude of 20,000 feet, will take us up very considerably above the limits of eternal snows, even upon the equator: where presumably (according to our present lights) the intensity of the constant cold will have wrung the air dry of all, or nearly all its moisture. If this be so, it follows that there must be other sources of water-supply existing in the atmosphere, in some form perhaps entirely unknown to us, which are capable of supplying the difference between the known and the unknown mediums for replenishing the terrestrial waters.

For example, in the highly rarefied atmosphere known to exist at great elevations, there might be a large admixture of hydrogen gas, which from its extreme

*See Vol. i., Chapter iv. on "Climates and Temperatures," where several such instances are cited.

lightness would probably ascend automatically from the earth, as the result of chemical decomposition continually in operation there; and it is conceivable that great electrical disturbances, indicated by the tremendous explosions whose echoes occasionally reach our ears on earth in the form of thunder, might cause the chemical formation of large quantities of water.

We mention this as only one of the causes which might account for the sudden downfall of the vast supplies of water, which are seen at times to fall from the sky; for as we know, these torrential rains are almost always accompanied by electrical phenomena of great intensity.

We must however ask pardon of our readers for thus leading them into the realms of theoretical speculation; for we need hardly say that all these things are merely matters of conjecture, and are only put forward as such. When there are so many things unknown to us here on earth which are always open to our inspection: how shall we pretend to have knowledge about the things far removed from earth, in the eternal expanse of heaven?

Passing however from this survey of the invisible atmospheric ocean to that of the visible ocean, whose great waters it supplies, we find that they cover an area estimated to amount to about three fourths of the whole surface of the terrestrial globe; whose water surface, to speak with somewhat greater accuracy, is calculated at about 144,712,000 square miles.*

Now as regards this vast expanse of ocean, though geographers may, as a matter of convenience, assign local names upon their maps to certain portions of it,

* *Encycl. Brit.*, 9th edit., Vol. x., p. 221 (Article "Geognosy").

still we must remember that all parts of its waters are more or less intimately connected with each other, and therefore as a matter of scientific fact it must be regarded as but a single sea, which encircles the earth in one continuous liquid expanse, bathing with its waves the coast of every country, from the torrid regions of the equatorial zone, to the icy shores of the two opposite poles.*

We have however good reasons to know that the present limits of this ocean have undergone many and great changes in the remote ages of the primeval world; this, geologists tell us, is conclusively proved by the existence of marine shells and fossil sea fish, in the rocks, clays, etc., found high above the present sea-level. This would be too large and intricate a question to enter upon here (moreover we have ventured to briefly touch this subject elsewhere in these pages). It may however be stated that though land has been upheaved by repeated convulsions, during the course of ages, from the beds of the shallower seas, in some places; and though land has sunk beneath the waves in others; still it is now generally accepted, as a matter of scientific truth, that water has always during the vast period since life first existed upon our earth, filled what is technically known as the "Abyssal Region" of the ocean—that is to say *the great deeps*—during an immense period of geological time. † We therefore have before us this undoubted fact, that alone almost among every other feature upon the

* *La Terre et les Mers*, par Louis Figuier.

† See "General Conclusions as to Scientific Results obtained by the *Challenger* Expedition"—Vol. i., p. 49 of the Introduction to the Scientific Reports, prepared under the superintendence of Sir C. Wyville Thomson, F.R.S.

surface of the terrestrial globe, the ocean still exists as it did in that immense eternity; which there can be no doubt, is as much the attribute of the past, as we believe it will be of the ages yet to come. And Lord Byron (though possibly unconsciously) has in fact but finely expressed a great scientific truth, in alluding to the ocean in those remarkable and beautifully poetic lines, when he exclaims:

> "Unchangeable in thy wild waves' play,
> Time writes no wrinkle on thine azure brow,
> Such as creation's dawn beheld, thou rollest now."

Unfortunately our knowledge of these great deeps is necessarily of the slightest. The great expense and difficulty in carrying out scientific investigations in water, at these enormous depths, have hitherto proved an insuperable bar to anything being attempted in this respect, except by a few regularly organized scientific expeditions, specially fitted out for this purpose by the principal naval powers.

One of the last and most successful of these was the voyage of H.M.S. *Challenger* under Captain Sir George Nares, R.N., which set out in 1873 and returned in 1876.

Indeed there can be no doubt that—"the largest addition in recent years to our knowledge of the earth, has been made *in the ocean;* notably by the different expeditions and cruises equipped for the purpose by the British Government." †

Many interesting and most important facts have thus been ascertained concerning the great deeps, and among

* Lord Byron's *Childe Harold's Pilgrimage*, Canto iv., Stanza 182.
† *Encycl. Brit.*, 9th edit., Vol. x., p. 211 (Article "Geognosy").

other things it has enabled some idea to be formed as to the area of this region (now known as "The Abyssal Region" of the ocean), which is estimated at "about one hundred millions of square miles." It is also now ascertained that this enormous area, considerably exceeding the whole surface of the terrestrial globe in extent, lies at a mean "depth of 2500 fathoms beneath the surface of the sea." *

Of course it will be understood, that when 2500 fathoms or nearly three statute miles (2640 fathoms = 3 miles statute measure) is given as the *average* depth of this great region, its greatest depths are very much greater still.

The deepest sounding obtained by the *Challenger* expedition in the Atlantic Ocean, "being one taken about 100 miles north from the island of St. Thomas, which was 3875 fathoms" (or 4 miles 710 yards) † in other words 23,250 feet, or as near as possible the height of the summit of the Aconcagua in Chili, the highest mountain on the continent of America.

This great depth was however eclipsed by the results obtained in the Pacific Ocean, where, "in 1875 when sounding the channel between the Carolines and the Ladrones islands, the *Challenger* met with the deepest water of the cruise, 4475 fathoms" (or upwards of 4½ miles) "and this is the greatest depth from which a specimen of the bottom has hitherto been obtained." §

* See page 46 of the Introduction to the Report on the *Scientific Results of the Voyage of H.M.S. Challenger*, Vol. i., 1880, Edited by Sir C. Wyville Thomson, F.R.S., Regius Professor of Natural History at Edinburgh University.

† In Lat. 19° 41′ 0″ N., Long. 65° 7′ 0″ W. Soundings N° 72., *Ibid.*, Vol. i., p. 52.

§ *Encycl. Brit.*, 9th edit., Vol. xviii., p. 121 (Article "Pacific Ocean").

N.B.—This sounding represents a depth of 26,850 feet, or 5 miles 150 yards; this however is still inferior to the elevation of some of the

The same authority further states that—"Near the entrance to the Sea of Ochotsk the United States ship *Tuscarora* found depths of over 4600 fathoms" (= 27,600 feet, this was off the north coast of Japan)—and for so far this seems to be the deepest point a line has ever sounded, assuming that it is correctly recorded, and is as near as possible $5\frac{1}{4}$ statute miles.

And now arises a question, concerning which scientific men are still divided in opinion, namely—Do living creatures exist at these enormous depths?

Some think that it would be impossible for life to exist under such conditions, in consequence of the tremendous pressure of the water at such great depths. The Scientific Report of the Voyage of H.M.S. *Challenger* prepared under the superintendence of Sir C. Wyville Thomson, F.R.S., Regius Professor of Natural History at the University of Edinburgh, however, speaks with no uncertain sound on this point, and says—

"The most prominent and remarkable biological result of the recent investigations, is the final establishment of the fact, that the distribution of living beings has no depth limit, but that animals of all invertebrate classes, and probably fishes also, exist on the whole floor of the ocean." *

The *Encyclopædia Britannica*, another highly scientific authority, however, while stating the results obtained by the *Challenger* Expedition, seems to decline to commit itself to any decided opinion on this point, and says—

Himalayan peaks above sea-level—that of Kinchinjanga, 28,156 feet, seen from Darjeeling at a distance of 45 miles, is an instance in point; and this as we know is exceeded by not far short of 1000 feet, by Mount Everest, at present set down at 29,002 feet; and it may be there are other peaks in Nepaul of still greater height.

* See page 33 of Introduction to the *Scientific Report*, Vol i., 1880.

"The greatest depth hitherto reached by a dredge in which fish were enclosed in 2900 fathoms." It seems however doubtful whether this fish was caught at the bottom, or enclosed by the dredge in its ascent, because the fish was one known to be found at moderate depths, but—"the next greatest depth, 2650 fathoms, must be accepted as one at which fishes do undoubtedly live. The fish obtained from this depth in the Atlantic (*Bathyophis Ferox*) showing by its whole habit that it is a form living on the bottom of the ocean." *

It may appear presumptuous for anyone to venture to lay down the law on so doubtful a point, but we humbly conceive that, reasoning from analogy, it would certainly appear probable, that fish *do,* as a matter of fact, exist everywhere, even in the profoundest depths of the ocean. Experience shows that the conclusions adduced from reasoning by analogy often lead to wonderfully accurate results; the argument in this case of course being that—"Whereas the Creator has peopled every known region with various forms of life, and has specially adapted each to its own peculiar conditions of existence—that therefore He has in like manner peopled the immense profundity of the ocean floor with its special forms of fish-life also." And the author is free to confess that he cannot resist the conclusion that further investigations will undoubtedly one day prove that fish exist everywhere throughout the ocean. The results of the *Challenger* Expedition, though some may hold that they do not, as yet, conclusively establish the truth of this theory, go at least a long way towards it.

It seems to be one of the weaknesses of human

* *Encycl. Brit.*, 9th edit., Vol. xii., p. 685 (Art. "Ichthyology").

nature, that it appears unable to fully eliminate the idea that because it would be impossible for any beings personally known to ourselves to exist under certain conditions, that therefore it is improbable that others, differently constituted, could do so. This is a very short-sighted view.

Our inference, as we respectfully suggest, ought on the contrary rather to be, that The Great Creator, who has filled all regions familiar to our cognizance with infinite numbers and varieties of living and beautiful creatures, is therefore not likely to have left far greater regions barren, and void of equally wondrous, though perhaps different forms of life. To doubt that this is so, is surely to unwittingly set bounds to the creative power of Omnipotence; and besides, scientific analogy, we venture to think, tends all the other way—for whenever, and wherever fresh discoveries are made respecting regions previously unknown, invariably and without exception they are found replete with new and heretofore unnoticed living organisms. It is so, whether we treat of the atmosphere above us, or of the depths of the earth beneath us. A good instance, if the reader will kindly pardon us for suggesting it, of the fallacy of this narrow-minded reasoning, that because a matter *appears* to be impossible, that therefore it must be so in fact, may be briefly illustrated thus: If we did not know that life existed in the sea, and a scientific commission was appointed to report upon its possibility, they would be obliged, in the absence of evidence of the existence of marine life there, to report that no land animal known to ourselves could exist there, and that life thus appeared to be impossible beneath the ocean waves.

This however brings us face to face with the ques-

tion—Under what conditions do these inhabitants of the mighty deep exist?

Of course there are those whose lives are passed near the surface, which man can readily observe; but it is of the inhabitants of the great deeps that we desire here to speak, and of the pressure which they must sustain at such depths.

The introduction to the Report of the *Challenger* Expedition has some striking observations on this head, as follows:

"So far as we can judge direct sunlight does not penetrate to great depths, and consequently in deep-sea animals the eyes are often absent, or are atrophied by disuse. In some cases at moderate depths, where a certain amount of light may still be supposed to penetrate, the eyes are large and clear, exaggerated apparently, to catch its last feeble rays. Many deep-sea animals are slightly and some vividly phosphorescent." *

It may be that this phosphorescence is a wonderful provision of Nature, to enable these creatures to use their own light to illuminate their path through these regions of eternal darkness. Unfortunately "*animals from great depths were always brought up dead*"—so that there was no opportunity of studying their appearance and movements while living. Death, and the great change of conditions at the surface, may have greatly modified the intensity of their phosphorescence while alive at great depths. There can be little doubt that the cause of death was the removal of pressure. That tremendous pressure, of which we can form no conception, is therefore to them the prime necessity of their existence.

* *Report of H.M.S. Challenger's Scientific Expedition*, 1880, Vol. i., p. 48 of Introduction.

Some idea of what that represents may be gathered from the description given of it by the same authority:

"The conditions of pressure at great depths are extraordinary. Pressure increases at the rate of one ton on the square inch for each 1000 fathoms of increasing depth; so that the inhabitants on the floor of the ocean, at its average depth of about 2500 fathoms, sustain a pressure of two and a half tons on each square inch of surface, compared with 14 lbs. of atmospheric pressure sustained by the inhabitants of the upper earth." *

Therefore the inhabitants of the mighty deep continually sustain a pressure 400 times greater than we do.

Some curious results caused by the pressure of the water upon the wooden portions of the trawl used on board the *Challenger* for bringing up specimens from great depths, are worth recording. It seems they found the trawl gave better results than the dredge, in very deep water, where there was a smooth bottom free from rocks; and the report states that:

"In very extreme depths, say between 3000 and 4000 fathoms, the enormous pressure affects the wood of the beam. On one occasion when a pine beam was used, the wood was compressed till the knots stood out one tenth of an inch beyond the general surface, and on another the beam was crushed as if it had been passed between two rollers." †

Nevertheless, as we see, various specimens of living animals are so organized as to find these peculiar conditions not only supportable, but even necessary to their very existence.

* *Report of H.M.S. Challenger's Scientific Expedition*, 1880, Vol. i., page 41 of Introduction.

† *Ibid.*, pp. 9 and 10 of Introduction.

Their existence is also passed, not only in a region of probable perpetual darkness, but also in one certainly of very great permanent cold: the temperature of the water there never rising much above the freezing point of fresh water on the upper earth. Again quoting from the Report of the *Challenger* Expedition we find that—"the normal temperature of this region is from 32° to 40° Fahr." *

With respect to this important point as to the temperature of the great deeps, the *Encyclopædia Britannica* makes the following observations:

"Even in the equatorial parts of the Atlantic and Pacific oceans, though the upper layers of the water partake in the heat of the intertropical latitudes, a temperature of 40° is found within 300 fathoms of the surface; while at the bottom, at depths of 2500 or 3000 fathoms, the temperature (32.4° to 33° Fahr.) is very little above that of the freezing point of fresh water. It has been proved that the bottom temperature of every ocean in free communication with the poles, has a temperature little different from that of the water in polar latitudes. Between Scotland and the Faroe Islands a sounding was obtained giving a temperature of 29.6° or 2.4° below the freezing point of fresh water. These observations warrant the conclusion, that a vast system of circulation takes place in the ocean. The heavy, cold, polar water creeps slowly towards the equator, under the upper, lighter water, which moves away towards the poles." †

Perhaps it is hardly necessary to remind the reader of the well-known facts that both with respect to air and water, a cold current is always heavier than a heated one, and also that "28° Fahr. is the temperature average sea water invariably assumes during the process

* *Report of H.M.S. Challenger's Expedition*, 1880, Vol. i., p. 48.
† *Encycl. Brit.*, 9th edit., 1877, Vol. x., p. 211 (Art. "Geography").

of congelation. De Haven invariably found the temperature of sea water under the ice 28° Fahr." in the arctic regions. *

The close analogy between many of the conditions of the atmospheric and aquatic oceans has been already referred to. And in no respect is it more striking than in the wonderful system of *circulation*, caused by variations of temperature: which in the atmosphere creates the winds, and in the water the great ocean currents; for it is now a matter of ascertained fact that to the *heat of the sun*, as its originating source, may be traced almost every movement, and every meteorological change, which takes place throughout the world, whether in the ocean or upon the terrestrial surface of the earth, or in the atmosphere above it. †

Among the many wonderful and important effects produced by heat upon the ocean, is the turning of immense masses of sea water into invisible aqueous vapour, which is conveyed all over the world by the winds, and thus, becoming purified from its saline particles, is made at length to fall in the form of rain to fertilize the soil, and by its vivifying influence causing every form of animal and vegetable life to live and flourish. Also portions of its surplus, after conferring all these numerous blessings upon the inhabitants of the land, sink into the ground at the higher elevations, and so produce the watersprings which issue forth from the living rock at the lower levels, for the sustenance of man and animals; and finally, having

* *The Physical Geography of the Sea*, by Lietenant Maury, U.S.N., 1877, 16th edit., p. 282.

† See *Heat a Mode of Motion*, by Professor Tyndall, 5th edit., p. 478.

accomplished every part of its beneficent mission on land, the remainder pours down again in the form of great rivers, to mingle with the ocean from whence it originally came.

Such is a brief outline of some of the principal phenomena of the great circulation of water by the atmospheric or gaseous ocean overhead, which we have considered more minutely elsewhere in these pages.*

Turning now to that of the liquid expanse of the mighty deep we find that the evaporation of water upon this gigantic scale, the alteration of its specific gravity at the surface of the ocean, and its expansion by means of heat, produce there a vacuum, which of course has to be filled by the heavier and colder water from below: and in this way, as is generally believed, a movement has gradually been communicated to the whole body of water throughout the ocean; the dense cold water, as has been already pointed out, creeping down along the bottom from both the polar regions in the direction of the equator, thus accounting for the icy chill of the water observed at great depths; and finally these opposite streams, meeting in the equatorial region, cause an upcast stream of cold water to be continually rising there, to supply the void caused by the movement of the heated water above; and so it is supposed the great ocean currents are set in motion.

Many learned works have however been written upon this complex and difficult subject, thus roughly sketched in a few brief sentences; and a careful study of the views held by the leading authorities shows that this opinion that the cause of the great oceanic

* See Chapter iv. on "Climates and Temperatures."

stream-currents is due to the influence of solar heat, is one which is now very generally accepted.

So long ago as 1833 the astronomer Herschel laid it down as a fundamental axiom—"that the sun's rays are the ultimate cause of almost every motion that takes place on the surface of the earth," * and in eloquent terms he proceeded to point out that by heat, as its motive principle, the whole material world lives, and moves, and has its being; and the investigations of scientific observers have since gone far to establish the correctness of Sir John Herschel's conclusions; the passage here referred to has moreover been quoted and relied upon as that of a leading scientific authority by Professor Tyndall, in his well-known treatise on "Heat." †

The *Encyclopædia Britannica* in the section devoted to the Ocean Currents of the Atlantic, also states,

"The solution of the problem seems to be afforded by 'A General Oceanic Circulation' sustained by opposition of temperature only, which was first distinctly propounded in 1845 by Professor Lenz of St. Petersburg. He particularly dwelt on the existence of a belt of water under the equator, colder than that which lies either north or south of it, as evidence that polar water is there continually rising from beneath towards the surface—a phenomenon which he considered admits of no other explanation." §

And it also appears that unaware of these opinions expressed by Professor Lenz in 1845, "Dr. Carpenter commenced in 1861, in concert with Professor Wyville Thomson, a course of enquiry into the thermal condition of the deep sea, which led him to conclusions es-

* *Outlines of Astronomy*, by Sir John Herschel, 1833.
† *Heat a Mode of Motion*, by John Tyndall, F.R.S., 5th edit., p. 478.
§ *Encycl. Brit.*, 9th edit., Vol. iii., p. 22 (Art. "Atlantic Ocean").

sentially accordant with those of Lenz." * This is perhaps as far as in a work of this kind it would be desirable to follow this branch of the subject—though without a few words shortly describing the mighty forces which these great stream-currents represent it might perhaps appear incomplete.

Their importance in modifying climates is well known; every schoolboy being aware that to the influence of one of them—generally known as the Gulf Stream—the mildness of our English climate is supposed to be principally due.

But the gigantic proportions of these great ocean rivers are perhaps less generally realized; though in point of fact the great rivers of the terrestrial world are dwarfed by them into absolute insignificance, for the largest of them is no more to be compared to one of these oceanic currents, than the tiny stream from the spout of a tea-pot is comparable to the volume of a first-rate river. These mid-ocean currents can in fact only be likened to moving aquatic continents, continually forcing their way through the liquid expanse of the mighty deep.

The celebrated American hydrographer, the late Lieutenant Maury, U.S.N., thus describes the onward flow of the Gulf Stream in the opening sentences of his world-renowned work, "The Physical Geography of the Sea:"

"There is a river in the ocean. In the severest droughts it never fails, and in the mightiest floods it never overflows. Its banks and bottom are of cold water, while its current is of warm. The Gulf of Mexico is its fountain, and its mouth is in the arctic seas. There is in the world no other such

* *Encycl. Brit.*, 9th edit., Vol. iii., p. 22.

majestic flow of waters. Its waters, as far out from the Gulf as the Carolina coast, are of an indigo blue; they are so distinctly marked that their line of junction with the common sea water may be traced by the eye—so sharp is the line that often half the vessel may be floating in gulf stream water, while the other is in common water." *

Then, to give an idea of the mighty power that impels this great current for thousands of miles across the stormy sea, he says—

"If we search for a propelling power we must admit the existence of a force capable of putting in motion, and of driving over a plain at the rate of four miles an hour, all the waters brought down by three thousand such streams as the Mississippi river." †

Of the tremendous power of running water we have daily proofs before our eyes in almost every considerable section of country. Everywhere we see how it has hollowed out for itself broad channels, and even in places cut deeply into the surface of the stony rock. What therefore must not the grinding power of these gigantic currents be?—They would, we might almost suppose, soon cut the earth itself in twain. But Nature here, as everywhere, is equal to the occasion; for far down in the depths of the sea, a still (or almost still) cushion of cold water rests upon the ocean floor, which relieves the earth from abrasion—and so the mighty river flows on for ever, without injury to its structure, bearing on its bosom countless myriads of the lower forms of life, and shoals of fishes, to furnish food for the inhabitants of the deep frequenting the coasts of far distant countries.

* *The Physical Geography of the Sea*, by Lieutenant Matthew Fontaine Maury, U.S.N., 16th edit., 1877, p. 1.

† *Ibid.*, p. 7, Section 17.

It is supposed to be the periodical arrival of these harvests of the sea which to a great extent regulates the comings and goings of our principal food fishes; for Nature has fixed the sequence of the harvests of the sea with as great regularity as she has those of the land; probably therefore our supplies of fish upon the British coasts are dependent upon this great Gulf Stream.

On this head the following remarks of Lieutenant Maury are worth quoting:

"Navigators have often met with vast numbers of Medusæ drifting along with the Gulf Stream; they are known to constitute the principal food of the whale. An intelligent sea-captain informs me that in the Gulf Stream off the coast of Florida, he fell in with such a shoal as has never been heard of. The sea was covered with them for many leagues. He was bound to England, and was five or six days' sailing through them." *—Lieutenant Maury then proceeds to explain that, "The Gulf of Mexico is the harvest field, the Gulf Stream the gleaner, which collects the fruitage planted there, and conveys it thousands of miles to the hungry whale at sea. But how perfectly in unison is this with the kind Providence of that Great and Good Being who feeds the young ravens when they cry, and caters for the sparrow." †

The cushion of still water resting upon the floor of the ocean has already been noticed, and a few words respecting it and the nature of the bottom of this immense region will complete this necessarily brief survey of deep-sea phenomena.

The secrets of the mighty deep until quite recently had entirely baffled all attempts to investigate them,

* *The Physical Geography of the Sea*, by Lieut. Maury, U.S.N., 1877, pp. 29 and 30, Sections 73 and 74.

† *Ibid.*, p. 31.

and "remained as fathomless and as mysterious as those of the firmament above." *

The little information however which has been collected thus far, shows that the bottom of the sea at great depths consists of very fine sediment, the accumulation of countless ages, deposited by the water.

The Report of the *Challenger* Expedition states that, "two kinds of sediment may be said to cover the area inhabited by the abyssal fauna" †—namely the "Globigerina Ooze" and the "Red Clay"—the latter of which seems to be found principally in the deeper depressions, while the better known globigerina ooze, is a fine calcareous deposit, somewhat resembling chalk, and composed to a great extent of shells, more or less broken or decomposed." Some of the specimens of this "mud," brought up by the surveying parties who were taking soundings previous to laying down the first transatlantic telegraph cables in 1858, from depths sometimes exceeding two miles, were found on examination by Professor Huxley to be almost entirely composed of minute shells of the genus *Globigerina*, whence the ooze has taken its name. Its consistency when first brought up is described as akin to that of putty. §

The American hydrographer Lieutenant Maury describing this remarkable sediment says:

"The unabraded appearance of these shells, and the almost total absence of any detritus from the sea, or foreign matter, suggest most forcibly the idea of perfect repose. Some of the

* *The Physical Geography of the Sea*, by Lieut. Maury, 1877, p. 206.

† See *Scientific Report of the Challenger Expedition*, Vol. i., pp. 41 to 43 of Introduction.

§ *Elements of Geology*, by Sir Chas. Lyell, Bart., F.R.S., pp. 317—318.

specimens were as pure and free from sand as the snow-flake that falls on the lea is from the dust of the earth. Indeed these soundings suggest that the sea is always letting fall showers of these microscopic shells. This process continued during ages has covered the depths of the ocean with a mantle, consisting of organisms as delicate as the macled frost, and as light as the undrifted snow-flake on the mountain." *

But how great a world of speculative enquiry do these facts reveal to the contemplative mind!

Here, if the author of these pages may be permitted to hazard an opinion, we may dimly perceive the vestiges of the world's creation. For these facts indicate to us, as do all the works of Nature to those who study them carefully, how The Great Creator, during the fulness of an immense eternity, has caused this little ball of earth to build itself up, atom by atom.

We have no evidence here of any great convulsion; nor is the doctrine of the Latin poet and philosopher Lucretius—"Docui nil posse creari de nihilo," taught nearly two thousand years ago, here done any violence to. What these facts tell us—so plainly that he who runs may read—is that little by little the water is here laying down the foundations of future cretaceous formations, precisely similar to the white chalk cliffs which our southern coasts are built up with.

"That white chalk is now forming in the depths of the ocean may be regarded as an ascertained fact, because the 'Globigerina Bulloides' is specifically undistinguishable from a fossil which constitutes a large portion of the chalk of Europe." †

* *The Physical Geography of the Sea*, by Lieutenant Maury, U.S.N., 16th edit., 1877, p. 225.

† *Elements of Geology*, by Sir Chas. Lyell, Bart., 6th edit., p. 318.

This, we may remark, is the delicate microscopic shell, described above by Lieutenant Maury, which belongs to the family of *Foramenifera*, the earliest —so far as it yet known—of all created things.

As regards the geographical extent of the white chalk in Europe alone, the same authority states that it extends "from the North of Ireland to the Crimea, a distance of 1140 geographical miles, and from the South of Sweden to the South of Bordeaux, a distance of about 840 geographical miles," in length and breadth respectively. And in Southern Russia, according to Sir Roderick Murchison, the white chalk "is sometimes found 600 feet thick." *

Now when we remember the enormous thickness of the cretaceous rocks, of which the white chalk forms but one out of a whole series, all of which bear evident traces of having been deposited atom by atom, through the agency of water, in a similar way—what a boundless vista of the eternity of the past is thus revealed to us!

That these strata *must* have been deposited thus, is evident; and this conclusion is generally accepted by all geologists of the present day—for they are full of these minute shells, and other remains of the ancient sea, many of them of so fragile a nature that one rough touch would have sufficed to destroy them—yet immense numbers embedded in these rocks are found in a beautiful state of preservation.

Even the very ripples formed by the water as it beat upon the primeval strand, are still in places plainly and unmistakably visible. All this shows, beyond the possibility of mistake, that these rocks

* *Elements of Geology*, by Sir Chas. Lyell, Bart., 6th edit., p. 316.

must have then been in the condition of soft mud or ooze, which has gradually encased these shells, and as time went on has become solidified, and finally converted into rock.

Now, when the attention of even the least instructed man is called to these palpable facts, the inevitable query is certain to arise—*How long did all this take?*

To a great extent this must of course always remain a matter of conjecture; and as might be expected, many learned works have been devoted to the discussion of this abstruse and intricate problem—with this result, that though all the best authorities were practically unanimous in admitting that it must have taken an enormous period of time—*geological* time that is—still the tendency of all recent researches has been to compel modern geologists to increase that enormous period almost indefinitely.

So that in geological time hundreds of millions of years have now to be reckoned with.

When we consider the extreme slowness with which the sediment of still water accumulates, which certainly only amounts to a few inches in a century. When we consider that this is deposited in the form of soft mud, reducible by pressure to almost infinitesimal proportions: it is evident that the time which it must have taken to build up the cretaceous rocks, which (be it remembered) form only a small proportion of the whole of the fossil-bearing strata known to science—must extend over a period wholly beyond the scope of our finite understandings.

The lesson therefore which these things seem to teach us is, that while people glibly aquiesce in ad-

mitting the existence of an eternity yet to come, we must not close our eyes to the fact that behind us that same immense eternity stretches forth in all its immeasurable greatness.

Here we close our survey of deep-sea phenomena. It is however quite worth while to glance at some of the living wonders of the shallower waters, especially in the neighbourhood of the coasts in the seas of the Southern Hemisphere.

A few words concerning the gigantic seaweeds and coral reefs of those comparatively little known regions in the great wilderness of waters, will however be about all that we can afford space for.

Sir Joseph Hooker in his splendid work upon the botany of these regions makes special mention of four remarkable algæ which he states are noticeable on account of their gigantic size. Three of these are found principally in the direction of Cape Horn, and one at the Cape of Good Hope; of the three former one great seaweed, the *Lessonia Furescens*, takes the form of arborescent branched trees, "with stems from five to ten feet high and as thick as the human thigh," above which shoot out "branches from which hang leaves one to three feet long"*—but the greatest of all seaweeds is the *Macrocystis Pyrifera*, a species of gigantic "kelp."

This seaweed we have the high authority of Sir Joseph Hooker for classing as "the longest vegetable production known."† He also tells us:

* *Botany of the Antarctic Voyage of H.M. Discovery Ships Erebus and Terror*, under Captain Sir James Clark Ross, by Sir Joseph D Hooker, 6 Vols; Vol. i., Part ii., p. 458.

† *Ibid.*, Vol. i., p. 455.

"So many interesting points are connected with the '*Macrocystis Pyrifera*' that a book might be instructively filled with its history; while its economy, and the myriads of living creatures that depend on it for food, attachment, shelter, and means of transport, constitute so extensive a field of research, that the mind of a philosopher might shrink from the task of describing them." *

It has been stated by previous authors that this seaweed had been found upwards of 1000 feet in length, but this Sir Joseph Hooker thinks is probably exaggerated. At the Crozet islands however he observed extensive beds of it, growing in water 40 fathoms deep, yet with the tops streaming a long distance along the surface. He estimated the length of these great weeds at about 700 feet, but admits that "the elongation of '*Macrocystis Pyrifera*' may be indefinite." † He then gives some interesting details as to its value to seamen, and states—

"It is, where growing, not only the infallible sign of sunken rocks, but every rock that can prove dangerous to a ship is conspicuously buoyed by its slender stem and green fronds, and we may safely affirm that without its presence many channels would be impracticable, and many harbours in the south closed to our adventurous mariners." "This gigantic weed," according to Sir J. Hooker, "is subject to every vicissitude of climate, and literally ranges from the antarctic to the arctic circle." §

Mr. Darwin, in his "Naturalist's Voyage" also gives very similar details, and was evidently greatly struck by the extraordinary properties of this remarkable plant.

* *Botany of the Antarctic Voyage of H.M. Discovery Ships Erebus and Terror*, under Captain Sir James Clark Ross, by Sir Joseph D. Hooker, 6 Vols; Vol. i., p. 465.

† *Ibid.*, p. 461.

§ *Ibid.*, p. 463.

"I know of few things more surprising," he says, "than to see this plant flourishing amid those great breakers of the western ocean, which no mass of rock, be it ever so hard, can long resist——" and yet it seems that, "the stem is round, shiny, and smooth, and seldom has a diameter of so much as an inch."—"The beds of this seaweed, even when not of great breadth, make excellent natural floating break-waters. It is quite curious to see in an exposed harbour, how soon the waves from the open sea, as they travel through the straggling stems, sink in height, and pass into smooth water. The number of living creatures of all orders whose existence depends on the kelp, is wonderful. A great volume might be written describing the inhabitants of one of these beds of seaweed. Often as I examined a branch of kelp, I never failed to discover animals of new and curious structures. I can only compare these great aquatic forests of the southern hemisphere with the terrestrial ones in the intertropical regions. Amid the leaves of this plant numerous species of fish live, which nowhere else could find food or shelter; with their destruction, the many cormorants and other fishing birds, otters, seals, and porpoises, would soon perish also; and lastly the Fuegan savage" (who feeds upon them) "would perhaps soon cease to exist." *

The wonderful works of Nature in the vegetable kingdom have always excited the interest and admiration of mankind on shore, but people's attention is more rarely drawn to the little known, but no less wonderful productions in the bosom of the mighty deep.

Here for instance, we see an apparently frail and slender plant able to do what the greatest breakwaters erected by human hands, out of masses of solid stone, would be often totally unable to effect. It

* *A Naturalist's Voyage round the World, in H.M.S. Beagle*, by Charles Darwin, 14th edition 1879, pp. 239—240.

requires those who have themselves seen the great rollers of the Pacific bursting in thunder upon a rock-bound coast, to realize what this wonderful seaweed is capable of performing, when it is thus able to turn the angry surge of an ocean never at rest, and which is perpetually beating with terrific force upon these storm-beaten coasts, into a peaceful calm.

But we might multiply almost to infinity the wonders of the mighty deep.

Take for instance the case of the coral reefs, built up by zoophites—that is to say by a species of minute and delicate sea anemone, both in form and colouring closely resembling the flower of the garden aster, *—working from age to age beneath the breakers of the Coral Sea. There are, as is well known,

"enormous areas in the Pacific and in the Indian Ocean, in which every single island is of coral formation." "The reefs often rising with extreme abruptness out of the profound depths of the ocean." † "The soundings on their seaward margin indicating depths of from 100 to more than 1000 fathoms, not far from the actual edge of the reef." §

And these wonderful structures in many cases extend for hundreds of miles. Thus "the Barrier Reef which encircles New Caledonia is 400 miles long," and "the group of 'Atolls' known as the 'Low Archipelago'" (in the Mid-Pacific Ocean) "encloses an area of about 840 by 420 geographical miles." **

Inside these reefs is generally a deep channel of calm water (usually averaging from ten to twenty

* *Coral Reefs and Islands*, by Professor James D. Dana, p. 48.

† *A Naturalist's Voyage*, etc., by Charles Darwin, p. 467.

§ *Encycl. Brit.*, 9th edit., Vol. vi., p. 278 (Art. "Corals").

** *A Naturalist's Voyage*, etc., by Charles Darwin, p. 467.

fathoms though sometimes much more) in whose pellucid waters shoals of brilliantly coloured fish may be seen—

"swimming about far beneath, as if in some great aquarium of unrivalled beauty, literally filled with myriads of the most varied and wonderful forms of submarine life." Also these still lagoon channels, as Mr. Darwin reminds us, "generally bathe a fringe of alluvial soil, loaded with the most beautiful productions of the tropics." *

Here the cocoa-nut tree, that queen of palms, with its roots bathed by the clear and briny waters, is usually found flourishing in all its regal glory.

While to seaward, upon the outward margin of these great reefs, the blue rollers of the mighty ocean in measured cadence, are ceaselessly beating with tremendous violence; and yet it is precisely here, in the midst of this terrific surf, where "the coral-polypes find their most congenial home." †

There are few more lovely and impressive scenes than may daily be witnessed off the coasts of these coral-girt islands, lying far out in the expanse of the boundless ocean. The salt, health-giving ocean breezes, continually wafted from seaward, at points exposed to the influence of the cooling trade winds, usually prevent the heat from proving oppressive; and here, beneath a sky unflecked by a single cloud, and often amid scenes of surpassing loveliness, the traveller may recline in the delicious balmy atmosphere and brilliant sunshine peculiar to these favoured regions, and watch these gigantic rollers, which even in the finest weather may constantly be seen sweeping forward in majestic

* *A Naturalist's Voyage*, etc., by Charles Darwin, p. 469.
† *Encycl. Brit.*, 9th edit., Vol. vi., p. 278.

procession, as far as the eye can reach on either side, until they burst upon these reefs, in miles of snow-white breakers, whose thunder is often audible during the deathlike stillness of the tropical night at a distance of many miles.

Thus as we have endeavoured to show, in things that are infinitely small—such as the microscopic shells which are building up white chalk in the abyssal depths, as also in those soft gelatinous zoophytes, the little architects of the great coral reefs—the Creator shows Himself quite as wonderful as when dealing with that which is infinitely great.

For as one of the ancient fathers of the early Christian Church has said: "Deus ita, artifex magnus, in magnis, ut minor non sit, in parvis." *

It would probably be difficult to find words more suitable in which to describe these wonders of the sea.

There is no more noble study than that of "The Ocean and the Inhabitants of the Mighty Deep;" for though man, except as a passenger rocked to and fro upon its restless waters, has never exercised any dominion there, it is the region of all others upon the surface of the terrestrial globe, which is most prolific in the infinite variety and abundance of its different forms of life; and which, unchangeable amid the ages, is at once the greatest, the most majestic, and yet the least known, of all the works of Nature here on earth.

Now as regards life at sea, it is often asserted that long voyages, as a passenger, across wide stretches

* St. Augustine, *De Civitate Dei*, xi—22.

of ocean, are dull and tedious to an almost insufferable degree. Life aboard ship has in fact been compared, in a moment of unwonted levity, by the great Dr. Johnson, to "a prison with the chance of being drowned."

Personally however, we must say for ourselves that we have never found this to be the case. Perhaps our readers would kindly bear with us while we state our experiences in this matter, though as a rule we prefer not to mix up our personal feelings and recollections with the records of the phenomena of Nature described in these pages. Our maritime experiences in the course of our wanderings to and fro over the earth's surface have of necessity been many and various; in all kinds of ships, belonging to people of many nations, and in all sorts of climates and weathers; and we are free to observe that nowhere can a man be more comfortable or pass a more enjoyable period of existence, than during a prosperous voyage, when all goes well, on board a *large* and *well found* ship. At sea, as a rule, the worries of the great world with its whirl and turmoil, are left behind on shore; and there is nothing to disturb the sense of infinite peace and rest to the nervous system which an ocean voyage supplies to a man of a well-balanced mind.

The number of invalids that now-a-days take advantage of these changes of scene and climate, is very large. In the case of the great P. & O. lines to India and Australia for example, this class of passengers forms quite an item in their ocean-going traffic, of considerable importance from a business point of view; and in the experiences of the South African and other shipping companies, the results are similar. It is quite

extraordinary what a large percentage of passengers on board most of the first-rate steamer lines, is now-a-days during the cold season made up of persons taking a tour round the world, or going out and home again as a change for the benefit of their health.

There is however just one drawback to the enjoyment of sea-life, which acts as a deterrent to many timid persons—that is of course "Sea-sickness." We do not propose at present to discuss this question in its medical or scientific aspects. We shall therefore merely say that long experience has taught us to regard it as to a great degree *mental*. We mean by that—people come aboard certain that they are going to be sick—and they are so. This is not a matter, however, in which it is of any use to "argue the question," as in some cases the least little motion seems to upset individuals; and we may just say that as a youngster no one has probably ever suffered more severely than we have: and yet for more than thirty years past, in the heaviest weather and under all sorts of trying circumstances, we have never once been sea-sick—we have "grown out of it" in fact.

A man much accustomed to the sea really ceases to feel or think of the motion of the ship, unless when it is of a very decided character; and we have frequently known our attention to be called to the fact that there was increased motion, by the lugubrious remark of a fellow-traveller—"Oh, the ship is beginning to roll again! Do you think it is going to be rough?" —As a rule however we have generally observed that after three or four days, most of the people find their sea legs, and cease to be affected, unless the weather is really bad. But it is often quite deplorable at the

outset of a voyage, to see how a comparatively moderate breeze will clear the tables at meal times. At the end of a week however, it takes a pretty considerable blow to upset the nerves of the great majority, of the male passengers at all events; and at the end of a long voyage, a storm at sea causing the plates and dishes to rush violently backwards and forwards among the "fiddles,"* has no other effect than to produce general hilarity among British passengers.

Nowhere is the superiority of the Briton as a sea-dog more conspicuous than in bad weather at sea. The foreigner, *as a rule*, is *nowhere*, in it. Nearly all the people belonging to the continental nations are as poor sailors as can well be imagined; † whereas the sea comes like second nature to the children of Great Britain, in the majority of cases. We have made it our business to take particular note of these things, and can say that this fact is neither imaginary nor the result of insular prejudice. In it lies one of the secrets of our naval pre-eminence.

When persons are really very bad sailors, wherever the weather admits of it, the sufferer should be got up and kept in the open air as much as possible, and in a reclining position, on deck. They should not attempt to come down to meals, but have their food brought to them there; and it should be borne in mind that if the sea-sick person feels cold, or is in any way allowed to become chilly, it will always make him worse.

* Wooden frames, laid across dining tables, made in compartments to prevent things flying off the surface during rough weather.

† For fear these observations should give umbrage to our American cousins, we may just say that most of them are of our own race and lineage—our own people in fact, whom in this respect we do not number among the *foreigners*.

How entirely our nervous systems are under the influence of *habit* receives a good illustration, by the delicate becoming quickly accustomed in most cases to the stormy ocean, and ceasing to think of his sea-sickness, or to suffer from it. So again on landing, after many days at sea, it is no imagination to say that one requires to look to one's "land legs." The earth at first seems to rock to and fro under the feet, in the most extraordinary way; so that after a spell of bad weather we have many times felt quite ashamed, when first attempting to walk along the streets, for fear people should notice any unsteadiness of gait, and put it down to a different cause. The sensation, however, disappears after a few hours. But its presence denotes how entirely, unconsciously to themselves, men become habituated to the heaving of the seas, and actually feel uncomfortable when they return to terra firma again.

Then as regards the restorative effect of the ocean breezes, after illness or overwork, that is long since a well-ascertained fact; but to obtain the maximum of benefit from a trip, it is of course of great importance to be well fed and well lodged. A sea-sick invalid confined to a crowded, stuffy, and perhaps dirty cabin, and fed on badly prepared food, besides being exposed to unpleasant noises and vibration, or unsavoury odours, cannot expect to reap the benefits of sea-life. These things used to be common, and on the less well appointed ships are by no means extinct even now. Care in the selection of ships and accommodation is therefore always most necessary to ensure comfort. But where proper care is exercised, one of the greatest and most efficient of all medicines is a long sea-voyage;

except of course in those cases where it is contra-indicated. Now from Europe to the Cape of Good Hope and to Australia, are both good examples of health-giving voyages—the first takes about 17 days, and the latter about 46 to 48 days, via the Suez Canal. Both may be regarded as generally fine weather trips. Any stormy time is usually confined to the British Channel and the Bay of Biscay; but after about three days out, when that is safely passed, as a rule the most perfect weather is enjoyed for the rest of the voyage.

Those who like bracing climates and do not mind cold winds, will perhaps prefer the route to Australia via the Cape; but the winds of the great Southern Ocean are mostly very chilly and penetrating, and plenty of warm clothing is necessary, as from latitude 40° S. the weather is generally stormy, with strong westerly winds blowing throughout the year. For hot weather light flannel or woollen garments are the best.

It is often advised to look out for cabins on a particular side of the ship, as regards the trade winds; but our experience is that so many circumstances may occur to modify these supposed advantages, that it is a question as to whether it is worth while giving much weight to these fancies. If the wind is too strong for instance, it may oblige ports to be kept shut on that side, in which case the supposed advantage is nullified; or unexpected variations of wind may cause it to veer away, and leave the favoured cabin no better off than less carefully selected ones. In hot weather, the worst thing that can occur is when the wind is moderate, and blowing aft, *i.e.*, *with* the track of the steamer; in such case, the ship running rapidly away before the wind, neutralizes the breeze, and leaves it

a dead calm on board. On the other hand, on a swiftly moving, powerfully engined steamer, even when there is no wind, her transit through the air at 18 or 20 statute miles per hour, *creates its own breeze*, so that on deck it feels comparatively cool, under awnings. The sea breezes are also almost always freshened by their passage across a vast extent of water; hot weather is therefore rarely felt very severely at sea. Moreover passengers can safely sleep on deck, when their cabins prove disagreeably close at night, as there is no fear of malaria on blue water. On the other hand, when lying in river estuaries or harbours off malarious coasts, the practice is an exceedingly dangerous one, and there is no surer way of getting a bad attack of fever. Our experience is that on first entering the hot weather after leaving the British coasts, almost an epidemic of colds and coughs frequently breaks out among passengers; this is due to foolishly exposing themselves in evening dress and other light clothing, to the night air, which is almost always chilly at sea. Simple precautions will prevent this, and should be attended to, as hot-weather colds are often difficult to get rid of. If however the weather is fine, and the life on board comfortable, nothing can be more lovely than the tropical nights and brilliantly star-lit skies. So also are the early mornings clear, fresh, and beautiful. It is quite worth while being up on deck by six to enjoy them. The decks will be in process of washing at this hour, but men can walk about bare-footed through the water without heeding this otherwise inconvenient interruption—and a good walk at this hour is pleasant and invigorating.

There are generally plenty of amusements of dif-

ferent kinds, going on on board a modern first-class steamer—consisting of games by day, and music or dancing by night. A ball at sea begins early, soon after dinner, and dancing is rarely kept up till a late hour. One of the prettiest scenes that it is possible to witness is a "ball night" during hot weather, upon one of our first-rate Indian passenger boats; the immense deck cleared for action, and enclosed by awnings decorated with flags of many colours, and brilliantly illuminated by electric lights, make an almost ideal ball-room, where perhaps over two hundred ladies and their partners may be seen parading up and down between the dances, in full evening dress; making not uncommonly quite a fairy scene.

Few landsmen have an idea of the vast floating hotels some of these ships are, and the immense population they convey to and fro, in safety and comfort, across wide stretches of ocean. The firemen alone, on the engine-room staff, will be well over 100 in number. In some big ships quite 80 stewards are kept for attendance on passengers. Cold storage chambers below carry fresh meat, poultry, fish, game, milk, and vegetables, in almost unlimited quantities, and even a supply of the most approved ice creams frozen in shapes, are taken from England, which only require to be turned out of the mould to be ready for use. Such is life upon a modern, first-class ocean steamer.

Before passing from this subject we desire to draw attention to the panorama of the star-lit heavens, as seen at sea, and may just remark here that nowhere can the study of the stars be carried on by amateurs so well and easily as at sea; for there is nothing to interrupt the view of the whole horizon, and with a

good star map, and some book giving a short description of the principal stars and constellations, the intelligent traveller can soon learn to recognise all the principal features of the celestial expanse that may be at the time exhibited. One little bit of information leads on to another, until a very fair acquaintance with the leading stars is obtained.

We have often noticed that anyone possessing a good knowledge of these things becomes at times quite a centre of attraction on board ship; and certainly to all who travel in wild countries no species of knowledge is more generally useful than a practical acquaintance with astronomy. We had in consequence prepared some data with reference to "The innumerable worlds that night unfolds to view," but the great length to which these volumes have spread out has obliged us to omit any further notice of this great subject from these pages. We shall therefore at once proceed without further comment to the consideration of the Wild Game of the Wilderness.

CHAPTER XIV.

GREAT HERDS OF GAME.

Author's Reasons for Collecting these Details. Ancient Records generally Regarded as Exaggerated. Reasons for accepting them as True in many Cases. How Immense Herds come to be Found in Sterile Tracts. Assemblages of Great Herds caused by Drying up of the Waters, or Famine. Alternatives to Game, when Flying before Drought and Famine. Human Settlers and Migratory Herds. The "Fly" in the Bush Country. Antelopes Unable to Remain Stationary there. The Great Buffalo Herds of Texas. The Northern and the Southern Migrations. The True Cause of the Assemblage of Great Herds is Want of some Kind. The Fallacy that Large Animals Require a Luxuriant Vegetation. Tree Feeders. Mr. Burchell and Capt. Burton on the Scarcity of Large Quadrupeds in Great Forests. Average Weight of the Principal Big-Game Animals. The Desert Vegetation During Droughts. Fragrance of Aromatic Herbage. Perfume Emitted by Skins &c. of Desert Game. Grass Fires as a Cause of Formation of Herds of Game. Retrospect of the Great Hunting Days. A Day's Game Display on the South African Veld 60 Years Ago. Capt. Cornwallis Harris in South Africa in 1836 (Sketches of Great Herds). Mr. Gordon Cumming on the Migration of Springbucks. Sir Samuel Baker in Defence of Mr. Gordon Cumming. Boer Battue of Antelopes. Sir Samuel Baker upon Herds of Game in Ceylon. Hartley the English Hunter. Mr. James Chapman at an African Drinking Pool by Night. The Same on a Great Herd of African Buffalo. The Same on Great Herds on the Botletli River. Herds upon the Lake Ngami Plains. Dr. David Livingstone on Great Herds on the Zambesi. Description of a Day and a Night in the African Wilderness in a Great Game Country. Elephants and Elephant Hunting. Mr. F. C. Selous on a Vast Herd of Buffalo. Game on the Chobé River. The Great Buffalo (Bison) Herds of North America —Francis Parkman the Historian upon. Lieut. Ruxton on Great Buffalo Herds. A Buffalo Stampede. The Buffalo Robe Crop of the Far West. Herds of American Elk and Cariboo. Herds of Deer in Persia. Australian Rabbits. Game at the Present Day. Mr. Pringle, the Poet of South Africa. Ode "Afar in the Desert." Literary Reminiscences of Pringle. Coleridge's Admiration of His Desert Poem.

BEFORE entering into the general subject of wild sports, or the use of the rifle as a sporting weapon—as this book aspires in some degree to form a record of the grand old hunting days, which were in the zenith of their fame during the early and middle portions of the 19th century—we have thought it desirable to collect together into a special chapter some accounts of the vast herds of game which are recorded as having been seen by great hunters and travellers in different parts of the world.

We have endeavoured to select these instances from the works of writers of acknowledged repute, whose books are always likely to form standard authorities upon such subjects.

People are however very apt to judge of the past by the present, and to regard with more or less incredulity accounts transmitted to them from former times, concerning masses of animal life and other phenomena, to which it would be impossible to find a parallel in the present day. It is quite an admitted fact that the quantities of game are everywhere steadily becoming less, and that sport is very far from being what it was; nevertheless the astonishing accounts that have been given as to the great herds which used at certain seasons to assemble together, in the experience of sportsmen and travellers of former days, are generally regarded, either as great exaggerations, or perhaps as altogether fabulous. How could any country possibly support such countless swarms of large animals? is a common objection to the accuracy of such narratives.

Perhaps the best reply to make to a query of this kind is by asking another question, namely—"If our ancestors could be recalled from the tomb, what would

they think of a book describing modern conditions of life?" Surely, *prima facie* these things seem even more improbable than any "traveller's tale" of former days. We will ask our readers to conceive, if they can, what their predecessors of a century ago would say if they could be told of the great herd of humanity now collected together in greater London?—to say nothing of such things as railway trains running upwards of a mile a minute, telegraphs, telephones, and many other modern inventions, every one of which would sound in their ears, like "talk" (to use an Americanism) of "the very tallest description."

We believe that the greater number of these old gentlemen would be very apt to doubt the accuracy of their respected grandson's yarns, and to say, "You have breakfasted, or dined, too well, my boy!"

We therefore desire to explain the real facts, and show that it is a very mistaken view of the case to suppose that these wonderful accounts respecting the mighty herds of game that have occasionally been seen in South Africa and elsewhere, were generally overdrawn. While we do not mean to say that fictitious reports may not at times have been circulated about them, we think there can be no doubt that in the main the accounts given by writers of repute were substantially correct.

As regards the apparent impossibility so frequently and positively asserted, of all these myriads of animals being able to find subsistence upon the generally arid, sterile country, where they were seen in former days, it may, we think, be very safely asserted that an entire popular fallacy exists upon such subjects. It is not a question of permanent pasturage. Wild game

seldom or never remain long in any one place, but roam over the plains in all directions, as grass and water happen to be plentiful, or otherwise. Therefore the question of any particular district being or not being able to maintain numerous herds, does not arise. In reality however, these great assemblages of animals represent the migratory movements of game in search of fresh pasturage, because of a scarcity of food in the country behind them.

Were a famine, an invasion, or any other great catastrophe to take place in London, it can hardly be doubtful that similar enormous assemblages of its inhabitants would pour out of the metropolis in hopes of finding provisions or safety in the country parts. Every road would thus be seen crowded with its stream of fugitives.

So it is with the game. As long as food and water are plentiful, they are scattered in small bands over the face of the country; but as supplies begin to fail they are compelled to shift their quarters; and these several streams of animal migrants, meeting together in the course of their passage from one district to another, form the mighty herds of game which created such universal surprise among the human spectators. As this movement is probably simultaneous and general over a very large area of country, it of course follows that the assemblage will be a numerous one.

Viewed in this light, there does not seem to be anything very extraordinary in this phenomenon, or which cannot be easily accounted for by this simple explanation of the facts.

The assemblage of these great herds however, was

not an ordinary, but an altogether exceptional occurrence—which only took place at certain seasons of the year. In South Africa this was during the long drought which occurs between the periods of the rains. In years when the rainfall was scanty, or failed altogether, the prolonged spell of dry weather caused the rivers and springs to become dried up, and the whole country assumed the appearance of a desert.

It will be at once obvious that this entailed the emigration of almost every living creature. These innumerable herds were then constantly driven onwards by the stress of want; they came as the swallows, or as the snows of winter: and they disappeared again in like manner, and not one of them was left. Drought, or famine, like a destroying angel, was for ever on their track, and like a swarm of locusts in passing over the country they consumed every edible substance in their course, leaving nothing but barrenness behind. As a general rule, where the direction of their wanderings could be traced, it was found that these destructive armies of beasts moved somewhat in the form of a great oval, going out one way and returning by another: thus their whole route passed over different sections of country and often proved a great scourge to the early colonial settlers.

During dry years even at the present time, stock farmers in the interior of South Africa, in the same country where these great assemblages of game used to congregate, sometimes have the greatest difficulty in preserving the lives of their stock until the return of the rains, and in some parts of the country large areas of land have to be abandoned and great losses of cattle etc. occur.

Many kinds of wild game, however, do not require water so constantly as domestic animals, they are therefore able to maintain themselves in the thirst-lands much longer than the human settler and his flocks. It has often been known that in districts where travellers and the oxen drawing their waggons have been perishing of thirst, considerable numbers of certain kinds of antelope have still been seen and when shot have proved to be quite fat, and in fine condition. Drought, however, is only one cause of game migrations; and it may be desirable to shortly state the principal remaining phenomena connected with these movements, which form a very interesting subject of enquiry in all its details.

In the great South African game country, for instance, there are two ways in which game can escape from the thirst-lands into well-watered and fertile grazing countries—first by a flight towards the northwards, which carries them towards the region of the equatorial rains; secondly by travelling southwards into the Cape Colony, where they enter the temperate zone, and by so doing pass into the region of the variable rains. Though these rains are not always very well marked, still this extreme southern part of Africa, as a general rule, is not subject to the severe droughts of the Karoo region, partly because of occasional variable rains, and partly because of the tempering influence of the sea breezes. Of course in these migrations into the Cape Colony the game soon came into contact with the Boers and other European settlers, and it was from this section of country in general that the earliest reports of the great herds have been handed down to us.

But in each of these cases immense migratory journeys had to be performed, and the difficulties as to subsistence were only temporarily relieved.

The arrival of one of these invading hordes among the settled districts was of course always regarded by the inhabitants as a serious calamity, and every one who could handle a gun was fully employed in firing "into the brown of them" as soon as they came within shot. If, on the other hand, they fled towards the north, they soon passed out of the plains regions of short grass, and got into the bush country of long grass. The further northwards they went, the thicker the bush became, and the taller the grass. Here they were attacked by the Fly, and numerous other insect pests, which at certain seasons render much of this country almost uninhabitable, for the smaller and thinner skinned animals, at all events. Moreover the thick nature of the country prevented them from detecting the approach of beasts of prey, and other enemies, which kept all except the very largest and most powerful animals in a continual state of alarm, so that they got no rest, either night or day. To remain long in such a country was therefore for them impossible; especially as most animals of the antelope tribe endeavour to avoid the neighbourhood of cover, and frequent only the openest plains.

Most of the game therefore, was kept constantly on the run, and wandered from one district to another in search of sustenance: hence the great herds were never stationary, and they may always be regarded as wandering, migratory companies.

In the Northern Hemisphere of course, these movements of game are the reverse of what they are in

the Southern, and we shall briefly sketch their course as seen in the great continent of North America.

The great game country there may be regarded as the dry regions of Texas, New Mexico, etc. Here the renowned buffalo (or more correctly speaking bison) had his natural home, and congregated in former days in incalculable multitudes during the winter season. But these animals being thick robed, preferred the cooler air of the northern prairies in summer to the great heats of the southern plains; thus with the advent of spring an immense northerly migration set in, which continued right through the great prairie region, and up into the barren grounds of Northern Canada, into what was then known as the Hudson Bay Territory.

Soon after their arrival there, however, the buffalo encountered the constantly increasing cold of the autumn nights, which warned them that the snows of winter were approaching. This caused them to retreat towards the south, and what was known as the autumn migration set in. Nevertheless considerable bands of these hardy animals used to brave the rigours of the northern winter; they soon, however, found themselves enveloped by the heavy snows which after the middle of November as a rule covered all that country with its icy mantle. The consequence was one might travel long distances there in winter time without seeing a living bird or beast, except perhaps a few bull buffaloes belonging to these bands. The game, as a whole, save and except these buffaloes, and the regular arctic habitants, had all been driven back again in another great migratory stream far to the southward.

As these matters will be treated of more fully else-

where in this work, we shall not pursue this subject further at present, but shall merely take occasion to remark that the experience of old hunters, naturalists, and travellers, and all those who have made a special study of animal migrations, is now pretty nearly unanimous in recognizing that great herds of game are almost always seen either in regions of scanty vegetation or else in climates where the rigours of the winter drive all except the arctic fauna away in search of milder climates.

It may safely be received as an axiom, that it is invariably the stress of want of some kind which in the first instance, causes them to assemble; and afterwards prevents them from ever remaining stationary for more than a very short time, while congregated together in numerous companies.

As regards the fact that great herds of game are seldom met with in regions of luxuriant vegetation—the researches of the late Charles Darwin have pointed this out in the clearest way, and show upon the most conclusive evidence that vast herds of game are found for the most part upon open plains covered by a poor and scanty vegetation. With respect to this Mr. Darwin goes on to observe—

"That large animals require a luxuriant vegetation has been a general assumption which has passed from one work to another—but I do not hesitate to say that it is completely false; and that it has vitiated the reasoning of geologists on some points of great interest, in the ancient history of the world. If we refer to the works of travel through the southern parts of Africa, we find allusions in almost every page, to the desert character of the country, and to the numbers of large animals inhabiting it. The same thing is rendered evi-

dent by the many engravings which have been published of the various parts of the interior. The fact that bullock waggons can travel in any direction, excepting near the coast, without more than an occasional half-hour's delay in cutting down bushes, gives perhaps a more definite notion of the scantiness of the vegetation. Now if we look to the animals inhabiting these wide plains, we shall find their numbers extraordinarily great, and their bulk immense. We must enumerate the elephant: three species, and probably five of rhinoceros; the hippopotamus, giraffe, buffalo, two zebras, the quagga, two gnus, and several antelopes, even larger than these latter animals. Besides these large animals everyone has read of the herds of antelopes which can be compared only with flocks of migratory birds, while the numbers of lions, panthers, and hyænas, and the multitude of birds of prey, plainly speak of the abundance of the small quadrupeds." *

Mr. Darwin thinks that there can be no doubt that our ideas as to the amount of herbaceous food necessary for the support of large quadrupeds are much exaggerated, many of the larger kinds of animals being tree-feeders, whose food chiefly consists of underwood. Now the twigs of this class of small trees and shrubs have a very rapid growth in the regular jungle region especially where they grow in the neighbourhood of springs, etc., and as fast as a part is consumed, its place is supplied by the growth of a fresh stock.

Another of the characteristics of many of these shrubs is that they send down their roots to very great depths into the subsoil, so that they frequently tap the subterranean springs, and so obtain an abundant supply

* *A Naturalist's Voyage round the World in H.M.S. "Beagle," during the years* 1832 *to* 1836, by Charles Darwin, 15th Edit., 1879, pp. 85 and 86.

of moisture in districts which appear to be and in fact are otherwise entirely waterless. Most of the desert grasses and other herbage possess similar powers, and where the sand is deep and the soil porous, there does not seem to be any practical limit to the depths to which their fine, hair-like rootlets may not penetrate.

Personally we have always held to the opinion that where considerable quantities of arborescent growths are found existing in apparently waterless tracts, it is an almost certain sign that water will generally be discovered by digging at no very great depths beneath the surface (for wells)—above all, if upon examination of the twigs of these shrubs, it is found that they produce moderately long season-shoots of young wood. These opinions, we may add, have recently been to a great extent borne out by the results of borings made in the Kalahari, the French Sahara, and other desert regions.

Mr. Darwin also points out that probably this class of food represented by twigs etc., cropped from the desert bush, "contains much nutriment in a small bulk." This is now an ascertained fact; and he calls our attention to the well-known case of the camel, an animal of no mean bulk, which has always been an emblem of the desert. And as we know, the camel obtains its nourishment from dry twigs, and tufts of dusty grass, and other desert products of the most apparently indigestible and unpromising character.

According to the *Encyclopædia Britannica* elephants in Africa are almost exclusively tree-feeders—especially of mimosas.

Some of the largest birds too, follow the example of the quadrupeds, and are found only on desert plains—

of these the ostrich, and the emu, are well-known and notable examples.

Mr. Burchell, the naturalist and well-known South African traveller of the early part of the present century, states that nothing struck him more forcibly, when he afterwards entered Brazil, than the splendour of South American vegetation as contrasted with that of South Africa, together with the absence of all large quadrupeds.

Captain Burton, the African traveller, in one of his papers published in "The Journal of the Royal Geographical Society," has been struck with the same remarkable fact, for speaking of the great African equatorial forests he remarks that, "The deep African forest is everywhere unfit to support animal life, unless it is broken by large clear spaces, where beasts can enjoy sun and air."

In illustration of these facts, Mr. Darwin, in his "Naturalist's Voyage," mentions some curious details respecting the results of some observations which have been made as to the relative weights of the largest game animals found in South Africa and South America respectively. He says—

"We may take 5 tons as the average weight of a full-grown elephant. The elephant killed at the Exeter Change was estimated (being partly weighed) at 5½ tons; at the Surrey gardens a hippopotamus cut in pieces was estimated at 3½ tons. We may give 3½ tons nearly to each of the 5 rhinoceri, 1 ton to the giraffe, half a ton to the *Bos Kaffir* (Cape buffalo) and eland. This will give an average of 2.7 tons for the 10 largest herbivorous animals of South Africa. In South America we have 2 tapirs, say 600 lbs. The guanaco 550 lbs. The vicuna 550 lbs. 3 deer 500 lbs each. The

peccari and capybara 300 lbs. The monkeys complete the number. The ratio will therefore be about 24 to 1 for the ten largest animals of the two continents.*

The foregoing details may be accepted as pretty conclusive evidence of the fallacy of the popular idea that a rich country is most productive in the amount of its animal resources. But when we come to deal with the Wilderness and its Tenants, we find we have to change a great many of our previously conceived ideas on these subjects.

The extent of country is usually so vast, and the habits of game so migratory and so little understood, that it is very hard to form any reliable opinion as to the amount of resident animal life which a country is capable of supporting, because in the dry season, when the tremendous power of the sun, combined with hot winds, scorches up everything like the blast from a furnace, vast districts may appear to be mere desert wastes—but by a wise and beneficent provision of Nature, the surface then becomes converted into a species of sun-dried brick, which affords complete protection to the various roots and bulbs of the desert plants beneath. These are mostly all possessed of immense, though dormant vitality, so that on the first approach of the rains they are ready at once to spring into growth.

All these countries, however destitute of animal and vegetable life they may at times appear to be, have each of them their season of fertility, however short, and the rapidity with which dry plains, in tro-

* *A Naturalist's Voyage round the World in H.M.S. "Beagle," during the years* 1832 *to* 1836, by Charles Darwin, 14th Edit., 1879, p. 87.

pical countries, are sometimes converted into luxuriant pastures, after the onset of the rainy season, is incredible, except to those who have witnessed it. No sooner do the life-giving streams of water descend upon the parched-up earth, than the prison doors are unlocked. Everything awakens to a new life, as if from the sleep of death itself. The dry, hard crust is broken up and converted into fertile mud, and as if by the touch of a magician's wand, the thirsty desert is made to blossom as the rose.

The beauty and fragrance of many of the desert flora at this period has been noticed in the works of numerous travellers—a great part of the herbage in fact consists of different kinds of aromatic plants, which give off their peculiar fragrance the moment they are either wetted, stepped upon, or touched, and during the deliciously cool hours of the lovely tropical nights and early mornings, their scent is generally peculiarly remarkable, the whole air being often at such times laden with their perfume.

The skins etc. of the wild animals inhabiting these desert regions are in the same way saturated with the prevailing perfume, and Mr. Gordon Cumming, the South African hunter, in several passages throughout his book makes mention of this fact.

Giraffes, for instance, he tells us, emit a powerful aroma, like the smell of heather honey, as also do elands and blesbucks. Like most other African antelopes the skins of these animals when freshly killed exhale a most delicious fragrance, highly scented with the perfume of the flowers and sweet-smelling herbage upon which the animals have been accustomed to lie and feed.

A secretion also issues between the clefts of their hoofs, which likewise has a pleasing perfume, doubtless caused by constantly crushing aromatic herbage with their feet. *

Thus when watered with the dew of the celestial bounty, the wilderness is transformed into a species of terrestrial paradise, brightened with exquisite flowers of powerful and delicious fragrance. It may be well also to mention that many of the desert Arabs of Northern Africa use the dry powdered droppings of the gazelle, which graze upon the Thymaceœ, as a species of powerfully aromatic and pungent snuff. This in some parts of the Sahara forms a regular article of trade, for which a high price is given.

Before closing this portion of our subject another cause ought to be mentioned which sometimes produces considerable assemblages of game animals. This is the practice of natives in hot and arid climates of firing the grass towards the end of the dry season, in order to ensure the springing up of a luxuriant crop of herbage for their domestic animals upon the appearance of the rains.

These fires frequently devastate large areas of country, both of forest and prairie, and leave nothing behind them but a blackened, ash-strewn desert, and this causes large numbers of animals to congregate along the course of some of the rivers, where the succulent nature of the herbage has prevented its destruction by fire. This, however, is clearly nothing more than another form of want, artificially created by these fires, which compels the temporary abandonment

* *Five Years of a Hunter's Life in the Far Interior of South Africa* (1843 to 1848), by Roualeyn Gordon Cumming, 1850, Vol. i., pp. 183, 253 and 271.

of certain districts by their animal inhabitants, and their assemblage in herds in the unburnt tracts.

The principal causes which impel the formation of the herds and their subsequent migratory wanderings having been duly related, we shall now proceed to recount descriptions of some of these great collections of game animals collected from different works of travel, which seem to furnish good historical examples of these grand panoramas of wild life as seen in times gone by, but still of comparatively recent date.

This is a subject upon which, from a sportsman's point of view, it is perhaps permissible to look back with enthusiasm, which is however not unmingled with regret, because for the most part these noble hunting scenes are gone never to return. Not at all, however, do we desire to regard them in the savage spirit of the mere slaughterer of hosts of harmless and beautiful creatures, with which the beneficence of the Creator had originally peopled and adorned the pathless wilderness: but rather to record them in unfeigned admiration of these grand scenes of wild life, which it has been the privilege of but few to witness, and which have now become for posterity a matter of historic interest only. Our view of this matter is that it would be a pity to let these things pass into oblivion, and therefore we have determined to collect together these narratives as memorials of such events—most of which, it will be observed, have occurred during the lifetime of persons yet living upon the earth.

The following describes the aspect of the great game country in South Africa, during a single day's march made some 60 years ago, as recorded by Mr. Charles Darwin in his "Naturalist's Voyage."

"Dr. Smith informs me that in Lat. 24°, in one day's march with the bullock waggons, he saw without wandering to any great distance on either side, between 100 and 150 rhinoceri, which belonged to three species. The same day he saw several herds of giraffes amounting altogether to near a hundred, and that though no elephants were observed, yet they are found in that district.

"At the distance of little more than one hour's march from the camp on the previous night, his party actually killed, at one spot, 8 hippopotami, and saw many more.

"Dr. Smith describes the country passed through that day as being thinly covered with grass, and bushes about 4 feet high, and still more thinly with mimosa trees.

"The waggons were not prevented travelling in a nearly straight line." *

The 24th parallel of latitude runs through the northern part of what is at present the Transvaal Republic, which exactly answers to this description of country. This open bush region runs from the neighbourhood of Pretoria northwards; and Lat. 24° S., then crosses the Limpopo, and runs along the course of the "Olifant's" (*i.e.*, Elephant's) River, for a considerable distance. This river is very beautiful and runs through wild and romantic gorges, and was celebrated in comparatively recent times as a great game country: at one time the whole of this region swarmed with elephants and other heavy game animals.

Not to go too far back into what might be termed ancient history, the remainder of these sketches of great herds of game have been restricted to instances within the last 50 or 60 years—but as will be observed the majority are of quite modern date.

* *A Naturalist's Voyage round the World in H.M.S. "Beagle,"* 1833 *to* 1836, by Charles Darwin, Edit. of 1879, p. 86.

Captain Cornwallis Harris, while travelling near the Meritsame River (South Africa), Oct. 9, 1836 relates the following details of what he saw:

"I went in pursuit of a troop of brindled gnoos, and presently came upon another, which was joined by a third still larger—then by a vast herd of zebras, and again by more gnoos with sassaybes, and hartebeests, pouring down from every quarter until the landscape literally presented the appearance of a moving mass of game. Their incredible numbers so impeded their progress that I had no difficulty in closing with them." *

We append another sketch by the same officer of the great herds seen by him near this same locality:

"We soon perceived large herds of quaggas and brindled gnoos, which continued to join each other until the whole plain seemed alive. The clatter of their hoofs was perfectly astounding, and I could compare it to nothing but the din of a tremendous charge of cavalry or the rushing of a mighty tempest. I could not estimate the numbers at less than 15,000, a great extent of country being actually chequered black and white with their congregated masses. The long necks of troops of ostriches were also to be seen, towering above the heads of their less gigantic neighbours, and sailing away with astonishing rapidity. Groups of purple sassaybes and brilliant red and yellow hartebeests likewise lent their aid to complete the picture, which beggars all attempts at description." †

The following sketches are from the pen of **Mr. Roualeyn Gordon Cumming of Altyre,** African Traveller and Hunter. This celebrated man, a scion of an ancient Scotch family, was a born hunter and sportsman.

* *Wild Sports of Southern Africa.* Exploration from the Cape of Good Hope to the Tropic of Capricorn in 1836 and 1837, by Capt. William Cornwallis Harris, Bombay Engineers, H.E.I.C.S., publ. 1841, pp. 54 and 55.

† *Ibid.*, p. 60.

Retiring from the Cape Mounted Rifles, he took his departure for the wilderness from Grahamstown (Cape Colony) Oct. 23rd, 1843. There he subsequently spent 5 years, wandering in his waggon through the far interior of South Africa, until, his health having been shaken by overwork and exposure, he finally returned to Europe in May 1849. He first entered the great game country a few days' march to the north of the present town of Cradock, where he encountered vast herds of migratory springbuck (*Gazella Euchore*) whose movements and appearance we shall leave him to describe in his own words:

"Upon our crossing a ridge I beheld the country as far as my eye could reach, actually white with springbucks, with here and there a herd of black gnoos or wildebeests prancing and capering in every direction, and lashing their white tails as they started off in long files at our approach. *—I felt at last I had reached the borders of those glorious hunting grounds, the accounts of which had been my chief inducement to visit this remote and desolate corner of the earth." †

Mr. R. Gordon Cumming (further describing Migrations of Springbucks):

"The accumulated masses of living creatures which the springbucks exhibit, on the greater migrations, is utterly astounding, and any traveller witnessing it, as I have, and giving a true description of what he has seen, can hardly expect to be believed, so marvellous is the scene. They have been well and truly compared to swarms of locusts, and like them they consume vast districts in a few hours. The course

* *Five Years of a Hunter's Life in the Far Interior of South Africa* (1843—1848), by Roualeyn Gordon Cumming, publ. 1850, Vol. i., p. 62.

† *Ibid.*, Vol. i., p. 63.

adopted is generally such as to bring them back into their own country by a different route from that by which they set out. Thus their line of march forms a vast oval, of which the diameter may be some hundreds of miles, and the time occupied by the migration may vary from 6 months to a year. *

"On the 28th (of December 1843) I had the satisfaction of beholding for the first time, a trek-bokken, or grand migration of springbucks. This was I think, the most extraordinary and striking scene, as connected with beasts of the chase, that I have ever beheld. For about two hours before the day dawned I had been lying awake in my waggon listening to the grunting of the bucks within 200 yards of me."—"On my rising and looking about me, I beheld the ground to the northwards of my camp, actually covered with a dense living mass of springboks, marching slowly and steadily along, extending from an opening in a long range of hills on the west, through which they continued pouring, like the flood of some great river, to a ridge about a mile to the N.E. over which they disappeared. The breadth of the ground they covered might have been somewhere about half a mile. I stood upon the fore chest of my waggon for nearly two hours, lost in wonder at the novel and wonderful scene which was passing before me, and had some difficulty in convincing myself that it was reality which I beheld, and not the wild and exaggerated picture of a hunter's dream. During this time their legions continued streaming through the neck in the hills, in one unbroken compact phalanx." †

During the whole of the day's march, the masses of these antelopes, Mr. Gordon Cumming assures us, became denser and denser, till their astonishing numbers baffled all attempts at description.

"Vast and surprising as was the herd of springboks which

* *Five Years of a Hunter's Life in the Far Interior of South Africa* (1843—1848), by Roualeyn Gordon Cumming of Altyre, 1850, Vol. i., p. 70 (part of a footnote).

† *Ibid.*, Vol. i., p. 122.

I had that morning witnessed, it was infinitely surpassed by what I beheld on the march—for on our clearing the low range of hills through which the springboks had been pouring, I beheld the boundless plains, and even the hill sides, which stretched away on every side of me, thickly covered with one vast herd of springboks; as far as the eye could strain, the landscape was alive with them, until they softened down into a dim red mass of living creatures." *

There were, he considers, some hundreds of thousands within view, yet on reaching an encampment of Boers, and talking to them about it, they said it was as nothing compared with what they had frequently seen. There is no reason to suppose that they stated what they believed was untrue.

"You this morning," said an old Boer, "beheld only one flat covered with springboks, but I give you my word, that I have ridden a long day's journey, over a succession of flats, covered with them as far as I could see, as thick as sheep standing in a fold." †

Mr. Gordon Cumming is one of those whom stay-at-home theorists have ridiculed as a "master of the long bow," denouncing his book as filled with the most monstrous exaggerations. Personally we feel convinced that his accounts may safely be received as substantially correct. All subsequent information about the South African game merely goes to corroborate what Mr. Gordon Cumming has said. We are therefore glad to be able to quote the opinion of a master in the sportman's art, who seems to have been entirely of the same opinion:

* *Five Years of a Hunter's Life in the Far Interior of South Africa* (1843—1848), by Roualeyn Gordon Cumming of Altyre, 1850, Vol. i., p. 123.

† *Ibid.*, Vol. i., p. 124.

"Often," says the late Sir Samuel Baker, "have I pitied Gordon Cumming, when I have heard him talked of as a palpable Munchausen, by men who never fired a rifle, or saw a wild beast, except in a cage; and still these men form the greater proportion of the 'readers' of these works."—"Men who have not seen, cannot understand the grandeur of wild sports in a wild country." *

Sir Samuel Baker speaks feelingly on this subject, and remarks, that this species of unfair criticism,

"is one great drawback to the publication of sporting adventures," for "they always appear to deal not a little in the marvellous; and this effect is generally heightened by the use of the first person, in writing"—"It is this feeling (he says) that deters many men who have passed through years of wild sports, from publishing an account of them." †

We may here observe that so lately as August 24, 1860, during the visit of one of our Royal Princes to South Africa, according to Dr. Schweinfurth, the Boers, assisted by a whole clan of Kaffirs got up a battue in honour of his arrival in their country, and between 20,000 and 30,000 antelopes are said to have been enclosed. § This shows the vast quantities of game still existing in quite modern times.

Sir Samuel Baker himself gives the following account of game seen in one of the noble open forests in the vicinity of the Yallé River, Ceylon:

"I never saw game in such masses as had now collected in this neighbourhood."—"There was too much game. During the whole day's walk I was certainly not five minutes without seeing either elk, deer, buffalo, or hog. The noise of

* *The Rifle and Hound in Ceylon*, by Sir Samuel W. Baker, Edition of 1874, Chapter i, p. 5.

† *Ibid.*, p. 4.

§ See Schweinfurth's *Heart of Africa*, 1874, Vol. i., p. 358.

the gun did not appear to scare them: they would simply retreat, and fresh herds were met with in following up the one that had been disturbed." *

Sir Samuel Baker and two friends killed fourteen elephants in one day in Ceylon on December 6th, 1851, † and in a three weeks' jungle trip this party killed fifty elephants, five deer, and two buffaloes. §

Referring to the vast numbers of elephants in that island sixty years ago (say about 1835) Sir Samuel Baker says:

"Three men in three days bagged 104 elephants. This was told me by one of the parties, and throws our modern shooting into the shade.—This was at a time when guns were first heard of in the interior of Ceylon, and the animals had never been shot at." **

Returning now to the consideration of the great African game country Mr. Edward Mohr, a German traveller, in his "Victoria Falls of the Zambesi" mentions the case of a celebrated elephant hunter and ivory collector belonging to the Cape Colony, named Hartley, whom he met in the course of his travels and who is thus described by him:

"Hartley is an old man of about seventy, with a long silver beard, who has been an elephant hunter since his 26th year, and is well known from Potchefstrom to the Zambesi. He told me that he had shot altogether over 1000 elephants, and he is at present the oldest and greatest hunter of Africa, south of the Zambesi. He is of middle height, very muscular, and strongly built, and still mounts his horse with

* *The Rifle and Hound in Ceylon*, by Sir Samuel W. Baker, Edition of 1874, p. 163; (originally published 1854).

† *Ibid.*, p. 342. See Chap. xii.— Account of "A Jungle Trip."

§ *Ibid.*, p. 351. See same.

** *Eight Years in Ceylon*, by Sir S. W. Baker. Edition of 1874, p. 114 (originally published 1855).

great agility. His face, arms, and hands are bronzed by constant exposure to the tropical sun." *

The old hunter finally succumbed to the effects of malarial fever, in March 1870, and was buried in the African wilderness, in which the greater part of his life had been passed.

Mr. James Chapman (Traveller and Explorer) gives the following description of the quantities of game seen coming to drink at a desert pool, known as the Mamtsoe Spring, situated in about Lat. 21° S., Long. 25° E. on the night of September 8th, 1854. A number of lions being in the habit of resorting nightly to this spring, either to drink or waylay the game, he went to lie in wait for them, in a shooting hole which he had constructed for this purpose:

"Soon after dark, and before the moon rose, I observed some objects crouching towards his (hunting companion's) post, and my cry of warning was lost in the report of his rifle. Five other lions now got on their legs, while two others were observed moving round the pool above the wind." †

The troop, numbering ten in all, actually besieged them for a short time, but were finally driven off by the firing:

"Game of all sorts came and went in vast multitudes all night, many passing within a few feet of us. I feel no scruple in affirming that, since the previous evening before sunset, till next morning after sunrise, except during the time of our being besieged by the lions, no less, at a very

* *To the Victoria Falls of the Zambesi*, translated from the German of Edward Mohr by N. D'Anvery, 1876, pp. 201 and 202.

† *Travels in the Interior of South Africa—comprising Fifteen Years' Hunting and Trading* (1849—1864) by James Chapman, F.R.G.S., 1868, Vol. i., pp. 238—9.

moderate computation, than 100 head of game, drank at the spring every five minutes. This in ten hours would make 12,000, which however enormous it may appear is, I feel confident, far within the mark. This pool, about 400 yards in circumference, was all night kept in commotion: the splashing of water, the din of clattering hoofs, and the lowing and moaning of gnus and their calves, being mingled in discordant notes. The braying of quaggas was terrible, and the pond, except at one or two short periods when we fired, was never clear." *

The following is another hunting scene, narrated by the same authority, of an immense herd of buffalo, witnessed October 9th, 1854, at Mokee Fountain:

"While in pursuit of a troop of about 400 pallahs, we found the spoor of an immense herd of buffaloes. Of these we fell in with a troop of eight, out of which M. and I bagged one each. While cutting up the buffalo, a rumbling noise like that of an earthquake broke over our ears, and we perceived a dense mass of black living game, like a troubled sea, extending over a large tract of plain approaching us. Moving out of the way, no less than from 800 to 1000 buffalo passed us at full speed, and fearful of being trodden to death in case of a change in their course, we waited till the whole herd had passed, and giving chase at their heels, we killed four and wounded several others." †

Mr. Chapman also relates the following respecting some great herds of game seen by him on the Banks of the Botletli river, South Africa:

"Troops of léché varying from 50 to 100, their warm colours heightened by the sinking sun, contrasted with the

* *Travels in the Interior of South Africa—comprising Fifteen Years' Hunting and Trading* (1849—1864, by James Chapman, F.R.G.S., 1868, Vol. i., p. 240.

† *Ibid.*, Vol. i., p. 265.

green carpet as they grazed peacefully within 300 yards of me. After dark I heard a troop of buffaloes butting each other. Buffaloes and rhinoceri quarrelled all night. At midnight elephants came. I let them go to the water. Three or four large bulls passed on fearlessly, but the females stopped on my spoor, and examined it. At length seeing the males were all right they also ventured down, and bathed for fully half an hour, during which I sat patiently waiting for them, having stalked to within fifteen paces of where they came down. A troop of 200 buffaloes, besides smaller parties had been drinking. It was a striking spectacle that ensued—buffalo followed buffalo, in a long unbroken line; when they come down the steep bank, they run down full trot, and dash into the water. The long file of elephants as they approached reminded me of a grand Indian military procession."*

Speaking of the desert tract between the Victoria Falls of the Zambesi and Lake Ngami, which Mr. Chapman crossed in 1863, he observes,

"The desert yields fruits for the use of man in greater abundance than might at first be supposed—berries of several kinds, edible roots, bulbs, etc. During the greater part of the year it is overrun by thousands of elephants, giraffes, rhinoceri, elands and other animals, who stay in it until driven away by the drying up of the waters; but no sooner do the clouds begin to gather than they turn their faces thither again, lingering on its borders until the rain falls on its loose and thirsty sands, when they re-enter triumphantly and dispersing in every direction soon fill it with life, revelling in the sweet luxuriant vegetation." †

These thirst-lands contain numerous tracts of waterless bush, and some belts of forests consisting of large trees.

* *Travels in the Interior of South Africa—comprising Fifteen Years' Hunting and Trading* (1849—1864), by James Chapman, F.R.G.S., 1868, Vol. ii., pp. 56 and 57.

† *Ibid.*, Vol. ii., pp. 297 and 298.

Most of the natural reservoirs of rain water are found, as might be expected, in the depressions in these forests. *

Dr. David Livingstone during his expedition to the Zambesi, states that near the mouth of the Kafué River,

"Game of all kinds is in most extraordinary abundance. The drought drives all the game to the river to drink. An hour's walk on the right bank morning or evening reveals a country swarming with wild animals. Vast herds of pallahs, waterbucks, koodoos, buffaloes, wild pigs, elands, zebras and monkeys appear; while francolins, guinea fowls, and myriads of turtle doves attract the eye in the covers, with the fresh spoor of elephants and rhinoceri. Every few miles we came upon a school of hippopotami asleep on some shallows and bank, their bodies nearly all out of the water appeared like masses of black rock in the river." †

A native hunting party, shortly before Dr. Livingstone's arrival, under the chief Sequasha, had killed 210 elephants in this same neighbourhood.

In a marsh on the River Shire, Lat. 16° 30′ S., Dr. Livingstone says that on one occasion he counted 800 elephants in sight at once in August 1859. He says, "the marsh is frequented by vast herds of these animals and prodigious numbers of many kinds of waterfowl."

On another occasion in this marsh he saw—"Nine large herds of elephants, which formed a line two miles long." §

The following is a description of the game as seen

* *Travels in the Interior of South Africa—comprising Fifteen Years' Hunting and Trading* (1849—1864), by James Chapman, F.R.G.S. 1868, Vol. ii., pp. 296—7.

† *Narrative of an Expedition to the Zambesi* (1858—1864), by David Livingstone, edit. of 1875, p. 225.

§ *Narrative of an Expedition to the Zambesi and the Discovery of Lakes Shirwa and Nyassa* (1858—1864), by David and Charles Livingstone, pubd. 1865, p. 97.

by Dr. Livingstone during a day and a night in the African Wilderness in 1860, in the game country:

"We slept near a lovely spot, with the Zambesi in front, backed by a semicircle of hills, leading to lofty mountains. The number of all sorts of game increases wonderfully every day. As a specimen of what may be met with, we may mention what has actually been seen.

"On July 3 (1860) a herd of elephants passed within 50 yards of our sleeping place, going down to the river. Starting a few minutes before the main body, we come upon large flocks of guinea fowl, and shoot what may be wanted; as we proceed, francolins of three varieties run across the path, and hundreds of turtle doves rise with great blatter of wing, and fly off to the trees. Guinea fowls, francolins, turtle doves, ducks, and geese are the game birds of this district. At sunrise a troop of pallahs, standing like a flock of sheep, allow the first man of our long Indian file to approach within about 50 yards, but having meat we let them trot off unscathed. Soon after we come upon a herd of waterbucks; we pass on, and see a herd of doe koodoos with a magnificently horned buck or two. Just as we were thinking of breakfast, we meet some buffaloes grazing by the path, but they make off at a heavy gallop at the sight of man. After breakfast we draw near a pond of water, a couple of elephants stand on its bank, and, at a respectful distance behind these monarchs of the wilderness, is a herd of zebras, and another of waterbucks. On plains between us and the river, many antelopes of different species are calmly grazing. Wild pigs are common, and walk about during the day. A mile beyond the pool, three cow buffalo and their calves come from the woods. A troop of monkeys on the edge of the forest, scamper back with loud and angry bark. Early in the afternoon, we see buffalo again and other animals. We camp on the dry higher ground, after driving off a solitary elephant. The nights possess nearly as much of interest as the days.

A new world awakes and comes forth more numerous, if we may judge by the noise, than that which is abroad by day. Lions and hyænas roar around us. Strange birds sing their agreeable songs, while others scream and call harshly, as if in fear, or anger. Marvellous insect sounds fall upon the ear; one, said by the natives to proceed from a large beetle, resembles a succession of musical blows on an anvil, while many others are indescribable." *

Coming now to more recent experiences **Mr. F. C. Selous,** African Hunter, in 1872, states that he made a clear profit of nearly £300, on ivory obtained from elephants killed in a trip of three months.† In the following year, 1873, in the Matabele country, between the Gwai and to the south of the Shangani Rivers, about Lat. 19° S. and Long. 17° E., in four months Mr. Selous states that he killed 42 elephants to his own gun, whose tusks averaged 70 lbs weight, the largest being 74 lbs. During the same time, he says, George Wood shot about 50, and the Kaffir hunters about 40 more—that would make a total of 132.§

On one occasion, on September 17th, 1878, during a later trip, they secured 22 elephants in one day; and on another occasion (in 1878) a party of Kaffirs on a plain killed 19." **

At the end of his book, Mr. Selous gives a game list, specifying the various descriptions of game shot between January 1, 1877, and December 31, 1880, by

* *Narrative of an Expedition to the Zambesi and of the Discovery of Lakes Shirwa and Nyassa* (1858—1864), by David and Charles Livingstone, 1865, pp. 210 to 213.

† See *A Hunter's Wanderings in Africa, a Narrative of Nine Years among the Game of the Far Interior* (1871—1880), by Fredk. C. Selous, 1881, p. 51.

§ See *Ibid.* p. 56.

** See *Ibid.* p. 343.

which it appears, that he killed altogether 548 head of large game (including the smaller antelopes and deer) during those four years. The number of elephants killed was 20, rhinoceri 12, giraffes 18, buffalo (*Bos Kaffir*) 100, lions 13. *

In another list of game killed from June 5 to December 5, 1874, the bag foots up to 93 head of large game, inclusive of 24 elephants, 9 rhinoceri, 19 buffalo and other animals;† this six months seems to have been a very successful period. Mr. Selous appears to have shot a great deal of his game on foot, which makes the record of work done, considering the means at his disposal, the more remarkable. With two common No. 4 smooth bore duck guns, purchased for £6 a piece, and a third at a trifle more, loaded with a handful of common Kaffir trade powder, he states that he killed 78 elephants in three seasons, all but one of which was shot on foot. §

Mr. Selous gives the following description of a great herd of buffaloes (*Bos Kaffir*) seen near the Chobe River in 1874:

"Just as I was about to commence supper, one of the Kaffirs reported that a large herd of buffaloes were coming down from the valley to the drinking place, on which I got up and went to the edge of the bush to have a look at them. The whole of the open ground was literally covered with their massive dusky forms, which in the dim twilight appeared twice their natural size. Though it is difficult to speak with any degree of accuracy as to numbers I think

* *A Hunter's Wanderings in Africa, a Narrative of Nine Years among the Game of the Far Interior*, by Fredk. C. Selous, 1881, Appendix, pp. 447, 448.

§ *Ibid.*, p. 448.

† *Ibid.*, p. 10.

there could not have been less than from three to four hundred."—"They were advancing rapidly towards the river, and soon their foremost ranks stepped knee-deep into the water, and after drinking their fill gradually gave place to those in the rear. Until twilight had given place to a clear starlight night I watched this interesting scene, standing just on the edge of the jungle and not twenty yards from the nearest of them."—"About an hour later, a troop of lions commenced to roar not far down the river. They seemed to be advancing towards our camp, roaring grandly at intervals, and at length reached the place where the buffaloes had drunk." *

The whole of the country in this locality along the banks of the Chobé Mr. Selous describes as being full of game. Before sunrise next morning he says:

"I started into the jungle in search of elephants and had not proceeded 300 yards, before crossing the fresh spoor of two bulls that had drunk during the night close to our camp, but so noiselessly as not to have awakened myself or any of my Kaffirs." And again, "The number of buffaloes about this part of the Chobé is really astonishing, and in no other part of the country have I found them so numerous. They are quite a nuisance to the elephant hunter." †

Some flat open plains, near by, were also covered with porkoo, antelopes, and other game: "The number of porkoos on this flat quite surprised me. Owing to the great numbers I christened this place the Porkoo Flats." §

As regards the herds of game seen on the Mababe and Chobé Rivers, October 26, 1879, Mr. Selous observes,

* *A Hunter's Wanderings in Africa, a Narrative of Nine Years among the Game of the Far Interior of South Africa* (1871—1880), by Frederick C. Selous, 1881, pp. 126—127.

† *Ibid.*, pp. 127—8.

§ *Ibid.*, p. 128.

"Being tired of shooting the zebras, blue wildebeests and tsessebe antelopes, which owing to the drought, had assembled in large herds from an enormous area of country to drink in the Mababe—hundreds of which might be seen at any moment from the waggons, I determined to make another journey on foot in search of elephants to the Chobé." —"The weather was most intensely hot both day and night." —"In the evenings it was quite a sight to see the herds of game coming down to drink. In cooler weather these animals would most of them have waited for the protecting cover of night, before venturing down to the river, but the intense heat made them forget their usual caution. Every evening, from about five o'clock till dusk, I was seldom out of sight of game of some kind—buffaloes, impalas, koodoos, lechwes, reedbucks, blue wildebeests, tsessebes, and wild pigs being the commonest; whilst sable and roan antelopes, zebras, and an occasional giraffe or eland were also to be seen." *

Here again, Mr. Selous describes the neighbourhood as swarming with heavy game, such as herds of elephants, and herds of giraffes, also many lions, troops of the latter being heard roaring grandly at intervals during the night.

Passing now to the consideration of the great Herds of buffalo (*Bos Americanus*) on the prairies of North America, accounts of these assemblages show that the vast numbers of these animals seen during the first half of the present century, seem to surpass anything in the way of really heavy game quadrupeds that has been recorded elsewhere.

"At any time between 1824 and 1836," says Colonel Fre-

* *A Hunter's Wanderings in Africa, a Narrative of Nine Years among the Game of the Far Interior of South Africa* (1871—1880), by Frederick C. Selous, 1881, pp. 402—3.

mont, U.S.A., "a traveller might start from any given point in the Rocky Mountains, journeying by the most direct route to the Missouri River, and during the whole distance, his road would always be among large bands of buffalo, which would never be out of his view, until he arrived almost within sight of the abodes of civilization." *

According to Mr. Fitzpatrick, and from his own cognisance of the facts, Colonel Fremont states that—"Our knowledge (of this great plains region) does not go further back than the spring of 1824," about which time the buffalo roamed in immense herds all through the country both to the east and west of the Rocky Mountains. "About the year 1834 or 1835 they began to diminish very rapidly" and by about 1840 had entirely abandoned the country watered by the Columbia and its tributaries.

In 1843, at the time Colonel Fremont visited these regions, the rapidity with which they were decreasing was the general subject of remark, as at that time the principal business of the American trading posts in the Far West was being carried on in buffalo-robes. In 1846 however, their numbers were still so vast, that the late Mr. Francis Parkman (the American Historian of Canada) describing the numbers seen by him on the Arkansas River, and the confused medley of sounds that were heard by night, coming from the mighty assemblage of these animals collected upon the adjacent plains near his camp—says,

"We encamped close to the river. The night was dark, and as we lay down we could hear, mingled with the howling

* *The Exploring Expedition to the Rocky Mountains, Oregon, and California*, by Brevet Colonel John C. Fremont, published Buffalo U.S., 1853, pp. 187 and 188.

of wolves, the hoarse bellowing of the buffalo, like the ocean beating upon a distant coast." *

The previous day the plain before them had been alive with innumerable herds of these mighty beasts—

"From the river bank," says Mr. Parkman, "away over the swelling prairie as far as the eye could reach, was one vast host of buffalo. The outskirts of the herd were within a quarter of a mile. In many parts they were crowded so densely together, that in the distance their rounded backs presented a surface of uniform blackness; but elsewhere they were more scattered, and from amid the multitude rose little columns of dust where some of them were rolling on the ground.—Here and there a battle was going on among the bulls; we could distinctly see them rushing against each other, and hear the clattering of their horns, and their hoarse bellowing—" †

George Frederick Ruxton (formerly Lieutenant of the 89th regiment) relates the following details respecting some great herds of American bison seen by him in Texas—

"We were now day after day passing through countless herds of buffalo. Some idea may be formed of their numbers, by mentioning that one day passing along a ridge of upland prairie at least 30 miles in length, and from which a view extended at least eight miles in length on each side, not a patch of grass ten yards square could be seen, so dense was the living mass that covered the country, in every direction. §

"One night while standing guard round the camp I heard an inexplicable noise like distant thunder, but too continuous to proceed from that source, which gradually increased, and drew nearer to the camp. Placing my ear to the ground, I

* *The Oregon Trail—Sketches of Prairie and Rocky Mountain Life*, by Francis Parkman, 8th edit. 1885, p. 336.

† *Ibid.*, p. 331.

§ *Adventures in Mexico and the Rocky Mountains*, by Geo. F. Ruxton, 1849, p. 299.

distinguished the roaring tramp of buffalo, thundering on the plain; and as the moon for a moment burst from a cloud, I saw the prairie was covered with a dark mass, which undulated in the uncertain light like the waves of the sea.—I at once became sensible of the imminent danger we were in, for when thousands and hundreds of thousands of these animals are pouring in a resistless torrent over the plains, trampling down all opposition to their advance, it is almost impossible to change their course, particularly at night. Even if we ourselves were not crushed by the mass of beasts, our animals would most certainly be borne away and irrecoverably lost. In the day time even our cavallada was in continual danger, for immense herds of buffalo dashed repeatedly through the waggons, scarcely giving us time to rescue the animals before they were upon us. Between Pawnee Fork and Cow Creek all our former experiences with buffalo were thrown into the shade, for here they literally formed the whole scenery, and nothing but dense masses of these animals, was to be seen in every direction, covering valley and bluff, and actually blocking up the trail." * (These events doubtless describe the transit of one of the great migratory herds, of which we have already spoken).

We must now briefly describe the decline and disappearance of the American buffalo (or bison) as a wild denizen of the Wilderness.

Up to 1871 at all events, buffalo still continued to appear in masses during their migratory movements at certain points of the Western Wilderness. Colonel Dodge for instance states that in May of that year he—

"drove from Old Fort Larned on the Arkansas, 34 miles. At least 25 miles of the distance was through one immense herd composed of countless smaller herds of buffalo on their journey north"—"The whole country appeared one mass of

* *Adventures in Mexico and the Rocky Mountains*, by Geo. F. Ruxton, 1849, pp. 300—306.

buffalo"—presently Colonel Dodge goes on to relate, that some of these animals seeing him in their rear—"started at full speed directly towards him, stamping and bringing with them the numberless herds through which they passed, and pouring down upon him in one compact mass of plunging animals, mad with fright, and as irresistible as an avalanche."

A few rifle shots however, split the herd into two streams, and he escaped from a most serious and awkward position: the same thing however "occurred so frequently within the next ten miles" that on arrival at Fort Larned he found he had 26 tongues in the waggon representing the numbers of animals he had killed in sheer self-defence.

For Colonel Dodge says—"I was not hunting, wanted no meat, and would not voluntarily have fired. I killed only in self-preservation, and fired almost every shot from the waggon." * Fortunately for himself, the Colonel's horse was a steady old buffalo runner, which kept quiet, and regarded the buffalo with unconcern. A restive horse is always a great danger on such occasions. This great herd, we may remark, is cited as a recent example of the buffalo migrations already spoken of some pages back in this chapter.

By this time (1871) the great buffalo range had become permanently divided by the Pacific railways; the animals thus found themselves more or less confined to certain restricted areas of country; and in 1872 on this becoming generally known, that deplorable slaughter of these splendid animals by greedy "skin hunters" began, which has ended in their practical extinction.

* *The Hunting Grounds of the Great West*, by Richard Irving Dodge, Lieut.-Col. U.S.A., 1877, pp. 120 and 121.

Colonel Dodge gives full details about the wicked massacres, of which some account has already been given in these pages.* We shall therefore merely mention that what was called "the robe-crop" of the years 1872—73 and 74, is stated by Colonel Dodge to have amounted to the "almost incredible number of nearly 4½ millions, killed in the short space of three years." † No account is taken in this, of the immense numbers killed by whites and Indians, whose skins did not come into the market; nor of the British trade returns of skins from the Hudson Bay Territory—and thus in a few years the buffalo, the finest representative of the large game of America, perished, and as a wild animal is now extinct.

The American elk, or wapiti (*Cervus Strongylocerus*) is the most magnificent of the wild faunæ of North America, which still survives the ravages of the professional skin-hunter.—We believe it to be absolutely the finest animal of the deer tribe in existence. Colonel Dodge mentions one noble stag, which is said to have "weighed, as it fell, 800 pounds; whose antlers attached only to the frontal bone, weighed of themselves 61 pounds." §

This splendid species of big game animals; used however rarely to assemble in large numbers, though frequently seen in small herds. In 1847 however, Captain Palliser, a British officer, and a personal acquaintance of our own early days mentions that—

"Near the mouth of the Yellowstone, we came in sight

* See chapter viii., Vol. ii. *The Region of the Great Plains.*

† *The Hunting Grounds of the Great West*, by Richard Irving Dodge, Lt.-Col. U.S.A., 1877, p. 143.

§ *Ibid.*, p. 155.

of a splendid band of upwards of 100 elk. Never shall I forget (he says) the grand and imposing appearance they presented, like a regiment of cavalry as they passed along the plain, the old stags with branching antlers leading the van." *

The cariboo (*Cervus Tarandus*) however (the American variety of the reindeer), during their annual migrations occasionally appear in immense assemblages in the sub-arctic regions of North Western Canada; † so also the prong-horned antelope (*A. Fucifer*) in the fall of the year is, or rather was, occasionally seen in large herds upon the western plains.

In Asia, likewise, these migratory assemblages of game have occasionally been recorded as occurring upon its boundless central table-lands; thus near Kaviz in eastern Persia, Ferriers reports numerous herds of many kinds of game being seen.

"The deer (he says) were feeding in herds of several hundreds, and at no great distance from each other. They were not frightened at our approach and frequently remained within gunshot. The wild asses were quite numerous but fled at the least noise."—"Near Kassan the game is collected in prodigious quantities, pheasants, blackcock, hares, partridges; also boars, deer, wild asses and carnivorous animals in great numbers." §

We might go on to chronicle truly marvellous assemblages of small game, and of wild fowl, in different parts of the world—some anecdotes of bird life of this kind will however be mentioned in our chapter on Wild Fowl and Wild Fowl Shooting.

The rabbit, in Australia for instance, alone, would

* *The Solitary Hunter on the Prairies*, 1856, by Captain John Palliser.
† See our Chapter on "The Arctic Zone." Chapter x. Vol. ii.
§ *Caravan Journeys*, by J. P. Ferriers, 1856, p. 141.

furnish materials of the most extraordinary description, which would occupy a chapter to itself had we space for such details. This however would be the history of an imported pest overrunning and destroying thousands of square miles of bush lands in that continent. In some districts they became so bad, that having destroyed every green thing throughout large areas of country, they subsequently perished of starvation, and their decaying carcases poisoned the whole atmosphere over many square miles. The rabbit in Australia probably furnishes the most curious example that has ever been chronicled of an animal becoming a pest through sheer numbers. The State had to fight them, like an army of foreign invaders.

These instances of great herds of game, already furnished, are sufficient to show the magnificent character of the sport which even quite recently was obtainable—and indeed may still be had in Africa and elsewhere, by sportsmen who care to go far enough in search of it. For it must be remembered a very large portion—both of the Asiatic and African continents—is still very imperfectly known, and the recent experiences of numerous hunting parties show what can be done in Africa, at all events, even at the present day, by energetic and fearless hunters.

Probably this chapter could not be brought more appropriately to a close, than by the reproduction of the poem "Afar in the Desert" by Mr. Thomas Pringle, the Poet of South Africa, which was first published in *The South African Journal*, in 1824.

A really good hunting piece, such as this, is rare —perhaps because few men of poetic genius have

had sufficient opportunity to enable them to write with accuracy upon such subjects.

Mr. Pringle's poem however, has long been extolled in the Cape Colony as a masterpiece of its kind, and by common consent it is generally admitted to be a most picturesque and lifelike description of South African deserts and desert game. This is sufficiently proved by the numerous quotations that have been given from it in the various works of African travel —and this must serve as our excuse for inserting it here.

The majestic character of the theme itself will be readily apparent, and as a graphic description of Desert Life it would probably be hard to match Mr. Thomas Pringle's Poem, as given in George Thompson's "Travels in South Africa" (1 Vol. 4to, published London 1827).

Afar in the Desert.

I.

Afar in the desert, I love to ride,
With the silent bushboy alone by my side,
When the sorrows of life the soul o'ercast,
And, sick of the present, I turn to the past;
While the eye is suffused with regretful tears,
From the fond recollection of former years;
And the shadows of things that have long since fled,
Flit o'er the brain, like the ghosts of the dead.
Bright visions of glory, that vanish'd too soon;
Day-dreams that departed, ere manhood's noon;
Attachments by fate, or by falsehood reft;
Companions of early days—lost or left;
And my Native Land! whose magical name
Thrills to my heart like electric flame,

The home of my childhood, the haunts of my prime,
All the passions and scenes of that rapturous time,
When the feelings were young, and the world was new,
Like the fresh bowers of Paradise opening to view.
All, all now forsaken, forgotten, or gone,
And I—a lone exile—remember'd of none;
My high aims abandon'd, my good acts undone,
Aweary of all that is under the sun;
With that sadness of heart which no stranger may scan
I fly to the Desert, afar from man.

2.

Afar in the Desert, I love to ride,
With the silent bushboy alone by my side,
When the wild turmoil of this wearisome life,
With its scenes of oppression, corruption, and strife:
The proud man's frown, the base man's fear,
The scorner's laugh, and the sufferer's tear,
And malice, and meanness, and falsehood and folly,
Dispose me to musing, and dark melancholy;
When my bosom is full, and my thoughts are high,
And my soul is sick, with the bondsman's sigh:
Oh then! there is freedom, and joy, and pride,
Afar in the Desert, alone to ride.
There is rapture to vault on the champing steed,
And to bound away, with the eagle's speed;
With the death-fraught firelock in my hand,
(The only law of the Desert land)
But 'tis not the innocent to destroy,
For I hate the huntsman's savage joy.

3.

Afar in the Desert, I love to ride,
With the silent bushboy alone by my side,

Away, away, from the dwellings of men,
By the wild deer's haunt, and the buffalo's glen,
By valleys remote, where the oribi plays:
Where the gnoo, the gazelle, and the hartebeest graze,
And the gemsbok, and eland, unhunted recline
By the skirts of grey forests, o'ergrown by wild vine:
Where the elephant browses at peace in his wood,
And the riverhorse gambols, unscared in the flood,
And the mighty rhinoceros wallows at will,
In the "vley" where the wild ass is drinking his fill.

4.

Afar in the Desert, I love to ride,
With the silent bushboy alone by my side,
O'er the brown "Karoo," * where the bleating cry
Of the springbok's fawn sounds plaintively;
Where the zebra wantonly tosses his mane,
In fields seldom freshened by moisture or rain;
And the stately koodoo exultingly bounds,
Undisturbed by the bay of the hunter's hounds,
Where the timorous quagha's wild whistling neigh
Is heard by the brack fountain, far away;
And the fleet-footed ostrich, over the waste,
Speeds like a horseman who travels in haste:
Hieing away to the home of her rest
Where she and her mate have scooped their nest,
Far hid from the pitiless plunderer's view
In the pathless depths of the parched Karoo; †
While the vulture in circles wheels high o'erhead,
Greedy to scent, and to gorge on the dead;
And the grisly wolf, and shrieking jackal,
Howl for their prey at the evening's fall;

* Karoo = desert or dry place (a Hottentot word).
† This and the three previous lines are from Noble's edition.

And the fiend-like laugh of hyænas grim
Fearfully startles the twilight dim.

5.

Afar in the Desert, I love to ride,
With the silent bushboy alone by my side,
Away, away, in the wilderness vast;
Where the white man's foot hath never passed,
And the quivered Koranna, or Bechuan,
Hath rarely cross'd, with his roving clan.
A region of emptiness—howling and drear,
Which man hath abandoned, from famine and fear;
Which the snakes and the lizard inhabit alone,
And the bat flitting forth from his old hollow stone;
Where grass, nor herb, nor shrub, takes root,
Save poisonous thorns that pierce the foot;
And the bitter melon, for food and drink,
Is the pilgrim's fare, by the salt lake's brink:
A region of drought where no river glides,
Nor rippling brook, with its osier'd sides,
Where no reedy pool, nor bubbling fount,
Nor shady tree, nor cloud-capped mount,
Are found—to refresh the aching eye:
But the barren earth, and the burning sky,
And the blank horizon, round and round,
Without a living sight or sound,
Tell to the heart, in its pensive mood,
That this is—Nature's solitude.

6.

And here, while the night winds round me sigh,
And the stars burn bright in the midnight sky:
As I sit apart, by the cavern'd stone,
Like Elijah at Horeb's cave alone,

I feel as a moth in the Mighty Hand,
That spread the Heavens and heaved the land,
A "still small voice" comes through the wild
(Like a father consoling his fretful child)
Which banishes bitterness, wrath, and fear,
Saying "*Man is distant,* but *God is near.*"

After Mr. Pringle's death which took place in London in Dec. 1834, a new edition of his poems with a sketch of their author's life was published, edited by Leitch Richey (8vo. London 1839), who comments upon this poem in these terms—

"The finest and most finished of the larger poetical pieces in this collection undoubtedly is 'Afar in the Desert.'—This is a poem, which once having read, it is difficult to forget—It lingers in the ears, like one of those old melodies that are associated with ideas at once of sadness and of beauty."

Coleridge on seeing it in Thompson's travels, wrote to Mr. Pringle respecting it, in the following terms—"I was taken so completely possession of, that for some days I did little else but read and recite your poem" (Extract Coleridge's letter to Pringle).

(N.B.—Since these pages were written, a new edition of Thomas Pringle's poetical works has been published by Messrs. J. C. Juta & Co. of Cape Town, edited by John Noble, Clerk to the House of Assembly.)

CHAPTER XV.

FOREST AND JUNGLE SHOOTING.

Why the Subjects of Forest and Plains Hunting are Treated of Separately. Home Shooting Parties *versus* Game Shooting in the Wilderness. Why Novices should never Go out Alone. Necessity for Securing the Services of Native Hunters and Trackers. Fly Time in the Woods. The Erratic Movements of Game. Wood-Craft as a Special Art. Equatorial Forest Tribes. The Density of these Forests a Bar to Hunting. Scarcity of Game in Dense Forests. Looking for "Sign" or Marks of Game. Footprints. Droppings. Trails Leading to Water. Game Paths. Game and Still Hunting. Intercommunication of Ideas among the Animal Creation. Hunting with Hounds, not found to Alarm Game like Still Hunting. The Question of the Fear of Man among the Animal Creation. Game more Alarmed by the Scent than by the Sight of Man. Savage Tribes distinguishable by their Different Peculiar Odours. Terror of Animals in the Arctic Regions on Catching the Scent of Man. The Wind in Stalking Game. Curious Facts in Natural History with reference to Scent. Absence of Scent in Young and Helpless Animals. Birds' Power of Retaining their Scent. The Scent of Dead Birds—Power of Retaining Scent ceases with Life. The Aroma of Plants. Plants which emit Aroma only by Night. Tame Game. Animals etc. that have never seen Man Startled at His Scent. Horses Stampeded by the Scent of the Camel. The Visual Powers of Wild Birds and Animals. Birds of Prey in Forests. Heavy and Powerful Animals Generally less Keen-Sighted than Weaker Creatures. The Powers of Vision of Forest and Plains Animals Contrasted. Objects in Motion. Deer and Moving Objects. "Stopping to Listen" in the Forest. Taking up a Stand to Watch for Game. Startled Animals and Birds alarm the Neighbourhood in their Flight. Wild Animals in their Lairs. Game Doubling on their Trails before Lying down. "Windfalls" and Young Trees in Forests. Forest Sloughs and Swamps. Game on Mountain Slopes—in Ravines etc. "Running Shots." Deer Stopping Short on Hearing a Noise. Flies and Game taking refuge in Pools. Beasts of Prey at Watering Places. Rarity of Herds of Game in Forests. The Morning Hours for Forest Hunting. Depredations of Game on Crops. Advent of Dawn and Movements of the Jungle Game. Night Shooting on Cultivated Lands adjoining Forests. Nocturnal Habits of Forest Game. Beasts of Prey as Game. Extraordinary Boldness of Deer and Other Timid Animals in Quest of Food by Night. Beasts of Prey much less Daring. Difficulty of Getting Shots at Them.

Man-Eating Tigers. How they become Man-Eaters. Lions in Somaliland. Loss of Life by Wild Animals in Russia. Travellers Devoured by Wolves in Hungary. Rewards for Destruction of Wolves in France. Packs of Wolves in the Hudson Bay Territory. A Party of 18 Persons Devoured. The Sense of Fear in Animals versus the Stress of Want. Birds and Beasts of Prey as the Friends of Sportsmen. Beasts of Prey Scarce in Great Forests. Noises in the Forest. The Footfalls of Hunters. The Great Stillness of the Primeval Woods. Scarcity of Singing Birds. Still Weather bad for Forest Hunting. Foot-Gear for Forest Hunting. Moccassins. Why Savages turn their Toes in. The Hunter's Dress. How Game catch Sight of Hunters The Hunter's Eye and Objects in Motion. The Hunter's Countenance. Restless-Eyed Men. The Power of Vision in the Wild and Civilized Man Contrasted. The Facility with which Forest Animals Hide. Big Game Standing Motionless Among Thick Bush. Protective Colourings. Deer and Antelope. Deer seek the Bush. Antelope the most Open Plain. Game among Bush. Thorny Bush. Thorns and the Thick Skins of Heavy Game. Tree-feeding Animals. African Buffaloes. Silent Movements of the Great Animals. Wounded Buffalo. Noiseless Tread of Elephants. A Drinking Pool in the Ceylon Forest by Night. Stormy Weather in the Forest. Lulls in the Wind. The Best Hunting Grounds in Forests. Blow Downs. Driving Game. Detatched Covers. Salt Licks. Waterless Forests and Desert Pools. Tropical Hot Weather Shooting. Shooting from Trees. Habits of Wild Animals Unchanged throughout Historic Time. The Law of Force in Nature. Forest Hunting in Snow Time. Winter Camps in the American Forest. The Fall in American Woods. Moose Calling. Moose Yards. Snow Storms in the Forest. Grandeur of the Snow-clad Pine Forest. Camping during Intense Cold. Blizzards. Trails of Game in the Snow. Travelling over Ice. Small Noises heard in the Stillness of the Forest. Carrying Things through the Forest.

WE must preface our opening remarks upon sporting matters by saying that we have thought it desirable to separate the subject of forest and jungle shooting from hunting and sporting on plains which is pursued in the open country. We must leave our readers to form their own conclusions as to the wisdom or unwisdom of that course, the reasons for which we shall endeavour to make apparent as we proceed. We have also added a chapter on bird shooting, where the shot gun comes into play, in place of the rifle; we have moreover taken the liberty of speaking of

the feathered tribes collectively as "Wildfowl" for reasons which will appear in due course—and we trust that the reader will kindly forgive this departure from the usual practice.

The use of the rifle as a sporting weapon, from our point of view, is an accomplishment whose value extends far beyond what is generally regarded as its employment as a mere accessory to making a bag of game. While we have no hesitation in asserting that the skilful hunter forms the raw material for the most formidable soldier in the world, space, and the fear of extending these volumes too greatly, induces us to remain silent upon these considerations in the pages of our present work. We shall therefore confine our observations to the rifle as a sporting weapon only; and while endeavouring to explain so far as that may be possible in words, what appear to us to be the leading secrets of the hunter's art, we shall at the same time describe the principal characteristics and habits of the forest animals, etc., because without making himself acquainted with these matters the would-be hunter after wild game in a great wilderness country would prove deficient in one of the most important qualifications which fit a man to follow the art with fair chances of success.

So far as our humble experience extends, such shooting as a man gets when invited to a shooting party at home, where the sportsman is attended by professional gamekeepers who know intimately every yard of the ground, and every circumstance connected with the sport to be had upon it, affords little useful help as to the plan of campaign in a wild country.

Gentlemen who live at home at ease are generally able to go out on such occasions accompanied by every element of comfort and convenience which wealth and an ultra-civilization can place at their disposal, and we are among the very last persons who feel disposed to depreciate in any way the good things of this kind, which come in as aids to enjoyment when out for a day's shooting. By all means let us brighten this short life in every way that may be possible, and use to the full every advantage and every comfort which circumstances place at our disposal. At the same time we must always bear in mind, when we have put the sea between ourselves and home, that conditions such as we have become accustomed to, do not generally apply to the novel circumstances which surround us in a foreign land: especially when, leaving the neighbourhood of civilization, we desire to penetrate into a wild country about which very little is known, and where it is often next to impossible to obtain information of a really reliable nature about it; and thus it comes to pass that a man may be accounted a very fair shot at home and, as one of a shooting party, may be able to hold his own with the others remarkably well; yet if this same individual goes out for his first day's shooting in a great forest country, or upon the vast expanse of the prairie or the desert, he will find himself nearly as helpless and almost as much out of his element as a child taken out by his father to try his first shot at a mark.

If it be in the forest, as we shall presently explain, the initial difficulty of making out the game has to be surmounted. It may however at first sight seem almost absurd to suppose that the form of a large animal could be invisible at close quarters; nevertheless we shall

show that until the eye has become trained to recognise animals under these novel conditions, this difficulty is very real and by no means imaginary. If, on the other hand, it be in the midst of a wide plain, why then all the novice's good shooting goes for nothing, and he finds that he cannot hit a haystack (as the common expression goes when a man misses everything), until he becomes accustomed to judge distances upon the great grassy sea, and gets used to the wholly different state of the atmosphere there, to that generally experienced in our dim climates. The glitter of the solar rays and their unwonted lustre so disconcerts his aim, that the new combination of circumstances literally, and not at all metaphorically speaking, put him out completely, and for some little time good shooting is unattainable. Then again the extent of country is so vast, the movements, haunts, and habits of the game so uncertain, and the conditions under which it has to be looked for, so different to what he has been accustomed to at home, that the new comer is at first completely baffled in his calculations, and finds his home experiences of little service in teaching him to find—and work his way up to within shooting distance of—the wild game of the wilderness. "It is only when left to ourselves" (says Captain John Palliser, in his "Solitary Hunter on the North American Prairies") "that we gentlemen of England feel how very little we are in the habit of doing for ourselves, and how helpless we are rendered by our civilization." *

If he has never had any experience in guiding his course through a wild country, for one thing the new

* Published in 1856. This charming little collection of hunting sketches is now out of print, and very scarce.

comer should always remember that it is a matter of exceeding danger for a novice to go off alone in quest of game, a thing which should never be attempted by anyone unaccustomed to the wilderness. He should never go anywhere out of actual sight of camp unless he is accompanied by some one or more trustworthy persons, competent to act as guides and counsellors in finding his way about. The number of serious and fatal accidents that have from time to time occurred by disregard of such precautions, has been very numerous; indeed after a careful study of the works of great travellers, we find that there is scarcely an individual who has not his own particular tale to tell of the troubles of this kind which have befallen him at one time or another during his career. Even the most experienced white hunters at times seem to lose their reckoning, becoming, what used to be known in the Far West in the early days of exploration, as "turned round." Experienced rangers, if out alone in the woods or on the plains, when they found themselves affected in this way, used to go into camp and wait until this peculiar affection of the nervous system passed off, which it generally used to do of itself after a short time.* On the other hand, the savage seems to be proof against these influences; and excepting during dense fogs, or other altogether exceptional circumstances lasting for a short time, his sense of direction seems never to fail him, and he can no more get lost in his native forests, or on his boundless plains and deserts, than a Londoner in his maze of streets.

Another reason why, in the forest especially, no man

* See *The Hunting Grounds of the Great West*, by Col. R. I. Dodge, U.S.A., 1877, pp. 46—48.

should go out alone, is because any ordinary mishap such as a sprained ankle or other casualty, which might prevent his making his way back to camp, would in that case become a most serious matter.

Thus Colonel Dodge, in entering his protest against this dangerous practice mentions, for the benefit of young sportsmen, an instance within his knowledge where a man went out hunting alone in the Black Hills, and fell into a chasm breaking his leg, and so perished miserably by starvation. Some three weeks elapsed before his remains were at length discovered by his friends. *

"I have known," says the Colonel, "very many instances of accidents, not very serious in themselves, but which would probably have been fatal had the individuals been alone when they happened. I speak from ample experience. Do not go hunting (on the plains) alone." †

A trustworthy native attendant who knows the locality well is moreover at all times an invaluable adjunct to the European out in the wilds in quest of sport. In America, there are many white men who, bred and born in the solitudes of the forest or upon the plains, have become so accomplished in the art of finding their way, that they are almost as good as any Indian—but if the services of a faithful and reliable Indian hunter can be procured the European tourist who contemplates a forest trip will do well to secure him. In Hindustan European sportsmen almost always act upon this policy, and secure the services of one or more local "shikaris," or native hunters, whose

* *The Hunting Grounds of the Great West*, by Colonel Richard I. Dodge, 1877, p. 111.

† *Ibid.*, p. 112.

assistance is really a *sine qua non* in finding and tracking game through the mazes of the Indian jungles.

The experiences of Indian sportsmen are unanimous upon this point—the usual practice advocated by those best qualified to judge is that while it may be convenient and desirable to have one or more native hunters to accompany the sportsmen throughout his expeditions, as gunbearers or personal attendants, the services of the local shikari, in addition to these, can never be dispensed with: he alone knows the habits and haunts of the game animals which inhabit the neighbouring jungles, and without his assistance the prospects of good sport would be so slender as in general to be worth but little. "No Shikari," says Colonel Kinloch, "is of any use, except in the country which he knows, and few have more than purely local knowledge." * So in the American woods, in a great forest region such as British Columbia still is, unless a sportsman secures reliable guides who know the lie of the country and the habits of the game, a man's whole season would be wasted in making his experience, and in trying to find out for himself the best hunting grounds, the locality of the principal lakes, and the courses of the main river channels.

These are among the first things that a man requires to know, so as to be able to hunt over a wild country with any prospect of success.

Success in forest hunting will also of necessity be largely influenced by the nature of the country, the climate, and the season of the year. If for instance,

* *Large Game Shooting, in Thibet, the Himalayas, and Northern India*, by Colonel Kinloch, the King's Royal Rifle Corps, Calcutta 1885, p. 214.

flies are bad, during certain months, deer, and many other kinds of forest animals run before them and move away to the hills, or to the higher slopes of the mountain ranges, where any such are within reach. While other sorts of animals, such as the Indian and African buffalo, will resort to the waters and wallow in their muddy shallows, in order that the coating of mud and slime which adheres to their skins may form a protection against these pests. Cold weather and the approach of winter will, on the other hand, drive most kinds of game down from the hills into the shelter of the heavy timber. Then if there is a long dry season, as in some of the Indian and African forests, the drying up of streams and pools may at certain times of the year cause whole districts of country which were full of game while water was plentiful, to be entirely abandoned by almost every living creature. The migratory game then congregate, perhaps in very large numbers, in the neighbourhood of the principal waters whose sources are inexhaustible. In this latter description of arid country most of the forest generally consists of dwarf and thorny trees and constitutes the regular bush jungle, which covers vast areas in many sub-tropical lands; and in spots it is often of a very dense and impenetrable character; in other places it assumes the form of a high grass jungle, consisting of bamboos and other giant grasses, which, when the drought has been for some time intense, become as dry as tinder. Those sections of country which still remain in such districts covered with a dense growth of heavy timber, are generally of a damp, well watered character, and are sure to be more or less copiously supplied with springs, where water is found

at all seasons. * In the hot weather, at least during the day time, most of the wild animals here find their resting places, from whence they sally out to the glades and open spaces in the early mornings and evenings—and many of them travel long distances in so doing, returning perhaps before daylight to their secluded retreats in the fastnesses of the forest, where it requires the most perfect knowledge of the country and of their daily habits, to enable the hunter to follow them with any chance of success. It is here that the services of the local native hunter come in so valuable; his aid being in fact, as we have said, a *sine qua non* for the European sportsman.

Even the natives of many countries are sharply divided into plainsmen and forest tribes. This is so in many parts of India and Africa. It is also well exemplified among the red men of America; some of whom call themselves "the people of the plains," as for example the "Tetouan" division of the Sioux or Dakota nation, whilst another division of the same people call themselves "Wah-pe-tou-an" or "the people of the leaves" because they inhabit the confines of a bush region on the margin of the great plains. But their hereditary foes, the Chippeways, are more especially a regular forest tribe, who rarely or never stray far from the shades of their native woods, which form for them both a canopy and a home. Thus it comes about that Indians belonging to the plains

* There are some exceptions to this rule. But then where heavy timber is, though the surface may be waterless it is practically certain, from a scientific point of view, that the roots penetrate to damp soil—it may be at a great depth—whence the rootlets by capillary attraction can suck up water. The roots of the date palm, for example, will go down certainly over 30, and possibly 40 feet or more, in quest of the life-giving moisture.

tribes rarely venture to trust themselves far into the recesses of extensive forests; and should they attempt to do so in their wars with the forest tribes almost always get the worst of it. It is the same with the forest Indians—the heaviest defeat the Chippeways for instance perhaps ever got in modern times, came about by a numerous war party numbering some two hundred "braves" venturing out upon the prairie, where they were surprised and destroyed almost to a man by the Sioux. *

Even among the natives of a country therefore, woodcraft and forest hunting becomes a special art, in which none except members of the forest tribes ever become adepts. A man must live for years in the woods to get an intimate acquaintance with the haunts and habits of the forest game; this is a speciality therefore in which very few white men excel. Those few who do so, are probably men of the American backwoodsman stamp, who have taken up homesteads in some of the many forest clearings, natural or artificial, which are to be found in all great forest countries. In bygone times, a century ago, history shows that such men were comparatively numerous in Canada and the United States; but with the destruction of the great primeval woods, professional forest rangers must now-a-days be scarce. Certain however it is, that at the time of the revolutionary war, † there were still many white men of the "Leatherstocking" type, § so graphically described by Cooper, who could find their way almost intuitively through the recesses of the most

* This event occurred in or about the year 1855. (Personal enquiries and experiences by the Author in the Indian country).

† 1774 to 1783.

§ See *The Last of the Mohicans*, by Fenimore Cooper.

extensive woods, and steer a straight course from one point to another with unerring skill, through a great forest country, in any direction, whether the route had ever been traversed by them before or not. Nevertheless in these days at all events, this faculty is confined almost entirely to the forest Indians,—of which the Mic-Mac tribe of New Brunswick may be cited as a good example; these men therefore make the best possible guides to sportsmen throughout that province.

In the great equatorial forests such tribes are still very numerous, and in the almost boundless expanse of the African and the Brazilian thickets, there are doubtless many native tribes who still believe that the whole world is one vast forest, and in whose minds the idea of a treeless plain could hardly be realized. We know that this is so also in Africa, where whole nations of forest people, according to Mr. H. M. Stanley, exist in the upper waters of the Congo system, who have never seen, or even heard of a grassy plain. * These forests, as we have not failed to point out in our chapter upon the Equatorial Zone, are almost everywhere of the densest possible character, so bound together by lianas and creepers of various kinds that a man has to make constant use of the hatchet or slashing hook to make his way along at all—and in such countries where white men have settlements, as for instance in Brazil or Central America, the settler never moves about without a weapon of this kind, as part of his personal equipment—a "machete," as it is called in Spanish.

* See Official Report of Dec. 28, 1889, on the results of his expedition, by H. M. Stanley, published in the London *Times* of Feb. 18th, 1890.

In these vast forest regions therefore, apart altogether from the frequently malarious nature of the country, anything like regular hunting is frequently impossible, for the noise which a man would make in forcing his way through the tangle of cord-like creepers, would almost certainly cause all forest creatures to glide silently away before he could possibly get within shot, or even within sight of the flying game. Thus it came to pass that Mr. Stanley during his great forest march of 160 days obtained little or no game.* Not at all because the forest was destitute of game, for the trails of game, he says, were exceedingly numerous, but because of the foregoing reasons. Very little hunting therefore has ever been attempted in forests of this description: the chances of getting lost are so enormously against the hunter that few would care to try it, nor would the quantity of game, we may very safely conclude, prove worth the candle; for though game of different species, both furred and feathered, may be numerous, the extent, the density, and above all the impassable nature of such forests renders following it practically impossible. †

Sir James Emerson Tennent, a learned writer on Ceylon for instance, dwells upon the fact that the density of the undergrowth in the forests of that island is such that—

"though it is capable of affording cover to the wilder carnivora, it is unfavourable to the growth of any kind of herbage fitted for the support of granivorous animals. Quadrupeds

* See *In Darkest Africa*, by H. M. Stanley, 1890, Vol. ii, pp. 83—84.

† See Mr. Stanley's remarks upon these points in *ibid.*

are therefore compelled to keep for the most part on the verge of the open country, and in the vicinity of water, where the phytophagous tribes find abundance of food, and the carnivorous congregate, attracted by the resort of the others." *

Most quadrupeds which are regular denizens of the forest are therefore not grass-feeders, but browsers, the twigs and foliage of trees forming their principal food. Those that are not, must keep near grass-land.

These remarks of Sir J. Emerson Tennent on the forests of Ceylon may therefore be held to be applicable to animals inhabiting great forests everywhere: sport is almost always confined mostly to the margins of the woods, or to the open spaces within them, and not to the densely timbered portions where game even when close to the hunter can seldom be caught sight of. The late Sir Samuel Baker, for instance, says—

"In travelling through Ceylon, the remark is often made by the tourist that he sees so little game—and it is a well-known fact that a hundred miles of the wildest country may be traversed without seeing a single head of game." †

Yet as we know, Ceylon, at the time when Sir Samuel Baker lived there (some fifty years ago) was a sort of sportsman's paradise; and the very district where the great hunter's and explorer's plantation was located, § is still the home of wild elephants and other splendid game: for the natural forest in that district as yet covers a very large section of country, full of deep and precipitous ravines forming almost impenetrable harbouring

* *Ceylon*, by Sir James Emerson Tennent, 1859, Vol. ii, p. 413.
† *Eight Years in Ceylon*, by Sir Samuel W. Baker, 1874.
§ Near Newera Eliya a hill sanitarium, now a well-known resort of tourists and invalids.

places for every kind of game. But as Sir Samuel Baker explains—

"The nature of most wild animals is to seek cover at sunrise, and to come forth at sunset—also unless the traveller is well accustomed to wild sports, he either passes animals without observing them, or they see him, and retreat before he remarks them." *

And thus it is quite easy to understand how it often happens that planters, living in such a neighbourhood, may pass even years in the country without ever seeing a wild elephant or much large game of any kind—just as an Englishman may pass his life in a hunting country and rarely or never see a fox, unless when it is driven out into the open by hounds. It may therefore be said that the wilder game in a great forest country is as a rule rarely seen, unless the hunter knows where to find it, and goes out on purpose to look for it; a man otherwise employed may pass a long time before he accidentally catches sight of it, and even then he generally comes upon it suddenly, at a time and place where he was least expecting to find it.

The same observations may to a certain extent be held to apply, with varying degrees of accuracy, to all great forest countries, whose umbrageous recesses may be traversed for long distances before any living representatives of the wilder and finer kinds of forest game are actually sighted by the expectant traveller; the visible evidences of their existence being generally for the most part confined to footprints, and other traces of their presence, which it requires the trained

* *Eight Years in Ceylon*, by Samuel W. Baker, 1874.

experience of a regular hunter to be able to interpret intelligently.

Upon first attempting to hunt an unknown section of country a day will therefore generally be well spent in first making a careful examination of these "sign," as they are called in America, so as to be able to form some idea of the nature and quantity of the game that it contains. This will be very necessary if a man is thinking of spending a short time in the neighbourhood, as he will thus be able to get a fair idea of how far the reports that have reached him from natives or local hunters are to be depended upon. The principal "sign" that will help him to form an opinion, will be footprints and droppings. It requires a certain amount of experience to be able to tell whether the former are recent or the reverse; and it would not be possible to describe on paper the precise differences between old and new sign of this sort; but habits of observation and a man's own common sense will soon lead him to form fairly accurate estimates upon such matters, though a tyro will do well to get all the hints he can from a hunter of known experience and respectability.

Ask him:—How long is it since these marks were made?—and ask him his reasons for coming to the conclusions conveyed in his answer.

For instance, if it is a footprint, was it made before, or since the morning dews have fallen? If there has been recent rain, was it before or since the rain? A skilled hunter, if he is an intelligent man, and if he chooses to do it, can generally indicate a number of little circumstances which when pointed out make it pretty clear whether he is making a correct diagnosis

or merely speaking at random—and which the intelligent young sportsman will at once see the sense of; he must however guard himself against exaggerating the quantity of game which these footmarks represent, a matter which is a very common source of error, particularly in the vicinity of drinking places. The margins of desert pools for instance, are often marked by such numerous footprints that one might easily be led to suppose that a very large number of animals had drank at their waters on the previous night; whereas a comparatively small band of thirsty beasts, trampling backwards and forwards, and jostling each other at the water's edge, may account for a very large number of these tracks.

The trails leading down to the water therefore, and the ground for some distance all round its margins should be carefully examined: and thus a fair estimate of the game frequenting it can generally be arrived at. It has been commonly remarked that even where no actual game paths exist, animals nearly always take certain fixed directions when approaching a spring, and in districts where water is scarce they may travel long distances to reach a favourite water hole, where experience has taught them the precious fluid is always to be found. These facts will therefore readily account for very large numbers of tracks found at, and around, places of this sort; while it may be that little or no game is to be found near them, or even for long distances all round during the day time. "One of the first and most ineradicable ideas" (says the author of the American 'Still-Hunter') "the beginner gets is, that there are about ten or twenty times as many deer about him as there really are."

"Little (Mr. Van Dyke thinks) can be determined from the examination of a small tract of ground," when endeavouring to form an approximate estimate of the numbers of game animals in a certain district of country; for as he states—

"one deer, especially an old buck, in the fall, will often track up two or three acres, or more; so that one would think there had been a dozen deer there." "You must move on then, over a considerable area of ground. And in so doing, it is still more important to note the size and freshness of the tracks and droppings. For the very same deer may have marked several acres yesterday, and several different acres the day before, until nearly 100 acres may be so marked, that to the careless eye, it would look like the work of 50 deer." *

Where a herd of deer, or other game, have been playing themselves about over a tract of ground, there is generally very distinct evidence of this in the tracks overlying each other in places, and so partially obliterating each other; and also in the footprints being all of different sizes; and if there are several different kinds of animals, they will be of different shapes, owing to the different formation of their feet, so that a skilful tracksman can not only tell the probable numbers of animals present, but also their different species, with very great accuracy. This of course, necessarily requires high proficiency in the art of reading the signs of the wilderness which however can be acquired literally, as the late Mr. Francis Parkman has poetically expressed it, much "as the scholar reads the printed page."

This peculiar gift is constantly found developed in a very high degree among the savage races of mankind

* *The Still-Hunter*, by Theodore S. Van Dyke, New York, 1888, p. 30.

everywhere, concurrently with an unfailing sense of direction which unconsciously to himself guides its possessor in his wanderings, with an accuracy almost as unvarying as the mariner's compass points the course which the navigator has to follow across the sea in order to reach a certain point upon the coast.

In consequence of the short distance to which the range of vision is restricted in a forest, it is by no means unusual to meet with very numerous and recent traces of game without any of the creatures themselves being visible—for most forest animals retire to the thickets to lie down in safe concealment during the day time, and only come forth at sunset. It is probable that the greater part of the night is then passed in feeding and moving about, and that soon after sunrise they again seek cover for the day; this is specially so in districts where game is much persecuted by hunters, above all by still-hunters.

Such at all events seems to be the general concensus of opinion among experienced sportsmen in every part of the world. Sir Samuel Baker, for instance, distinctly asserts that it is so under an equatorial sun in Ceylon. Mr. Van Dyke is still more emphatic about it as regards North American game of the temperate zone, and considers, very rightly as we believe, that there is nothing that tends to make game wilder than the practice of still-hunting, or creeping silently up to within shot, and unexpectedly opening fire upon animals resting in fancied security from the assaults of man, their most redoubtable enemy—

"for (he says) it is a settled fact, of which you must never lose sight, that a deer's habits and movements will be very much and very quickly influenced by still-hunting."—"Right

well they learn, and quickly too, that mischief without warning now lurks in every corner of the once peaceful home. And quickly they adapt themselves to this change of affairs." *

We think there can be no question at all that these unexpected assaults, coming without the slightest previous warning, do produce the effects Mr. Van Dyke asserts, for we see it in every kind of wild creature, both furred and feathered: the moment they suspect that lurking danger may beset them, every sense is strained to detect it, and is then unceasingly on the look-out for it—so again, in a home preserve, on the other hand, where game know that they are never allowed to be fired at, they become bold and confiding.

No better illustration of this can be found than in the conduct of wildfowl upon a pond in our own country—if they are constantly shot at they become so wary as to be almost unapproachable, whereas the very same birds, upon alighting upon a preserved water in a gentleman's demesne, perhaps located only a short distance off, will often let persons walk past within easy gun shot and within full view of them, without putting them up.

These notorious facts open up a wide field of curious and instructive enquiry; for it is not very easy to explain how this can be brought about among the wild game of an extensive forest district, only a very small proportion of which, in their own proper persons, can ever have been made the target of the still-hunter's rifle, and yet the panic which his proceedings creates spreads abroad on every side, and becomes general among the deer and other forest quadrupeds.

* *The Still-Hunter*, by Theodore S. Van Dyke, New York, 1888, pp. 26 and 27.

If the firing had been upon large herds of game by visible enemies recklessly firing "into the brown of them," upon the open plain, it would be easy to understand the thing; but in the forest game is very rarely found in herds, and the firing is mostly upon one, or at most upon two or three individuals; and when the shot is fired at a solitary deer or other animal, if it takes effect that particular beast disappears and is seen no more. It is therefore all the more remarkable to find scattered members of an animal fraternity all at once becoming aware of a lurking danger, proceeding from a source which must be hidden to by far the greater number of their society.

Can it be that each species of the animal kingdom has its distinct and separate language, in which what are generally regarded as the dumb beasts are enabled to communicate with, and speak their sentiments to each other, and tell of their fears and their perils?

It would appear so; at least, though we do not venture dogmatically to assert that this is the case, it seems difficult to give a satisfactory explanation of these matters upon any other supposition. Unless animals can in some way communicate their ideas to each other, intelligence of events happening to other members of the community, and not actually witnessed by the beast itself, should be beyond its cognizance. Yet we find that by some means this intelligence does spread with singular rapidity from beast to beast throughout a large area of country. If Mr. Van Dyke's experiences are to be received as reliable, they are conclusive upon this point, and we see not the slightest reason for doubting what he says, in what

we must regard as one of the most valuable treatises extant upon the forest hunter's art.

"I have seen deer," he says, "that I positively knew had no other disturbances than my own hunting, desert entirely the low hills and open cañons in which they were keeping before I began to trouble them, shift a thousand feet higher up, keep in the thick chapparal all day, and double their vigilance when they were out of it."—"They also learn to run on hearing a noise, without stopping to look back, to keep on running long past the point where you can head them off; to slip away before you get in sight of them, to skulk and hide in thick bush and let you pass them, and a score of other tricks we will notice as we go on." *

On the other hand, open attacks by hunters aided by hounds, though presumably they might appear to disturb a very much larger area of country, and be brought to the knowledge of a far greater number of animals, seem by no means to create so widespread a feeling of alarm among them generally, as the stealthy attacks of a single still-hunter upon a few—for again quoting from Mr. Van Dyke's pages it appears that the common idea that hunters, chasing deer with hounds, drives them away and makes them wilder, is to a great degree erroneous.

"This may in some places (Mr. Van Dyke thinks) be true. It may also be generally true if swift hounds be used. But there are places where it is not so, and within my observation deer have little fear of slow dogs. Deer that had been made so wild with still-hunting that it was almost

* *The Still-Hunter*, by Theodore S. Van Dyke, pp. 27 and 28. (N.B.—These facts, though unseen by the hunter would become evident from the trail. It is quite easy to see where a deer has started off with long jumps in a panic, and where it has stopped and stood to look round).

impossible to get even a sight of them, I have seen play along for half a mile across an open pine chopping before two curs yelping behind them. They seemed to consider it only fun, stopping every few jumps, and looking back at the curs, until they got within a few feet of them. About the tamest deer I ever met were some that were habitually chased by hounds, and never still-hunted." *

In Ceylon, where hounds are very generally used by the British planters in their hunting excursions, the general opinion is that they only cause temporary disturbance to the game, which will run before them while the hunt lasts, but soon return to their old haunts; and as a matter of fact, the wildest and heaviest game is often found close to the dwellings of man, and within ear-shot of most of the noises which are an accompaniment of human occupation—such as the noise of passing railway trains, noises made by vehicles and horses, hammering, gun firing, shouting, and other such sounds. In Ceylon, for instance, we were personally informed by station masters and others on the railway leading up from Kandy to Newera Eliya, through an extensive tract of jungle-covered hills, that the wild elephants constantly came down to the line, and in some instances had actually committed damages to some of the station buildings; their dung is also often found dropped upon the public roads, where there is considerable traffic by day.

Thus in 1894, a Ceylon paper informs us—

"Our Batticoloa correspondent writes—A rogue elephant has been seen between the 76th and 77th mile post on the Batticoloa road: also a herd of rogue elephants between the

* *The Still-Hunter*, by Theodore S. Van Dyke, p. 27.

59th and 60th mile posts on the same road. The Tappal runners have seen them, and are much frightened" *

and the paragraph concludes by advising some local hunters, known to be shooting in the neighbourhood, to "hurry up," in which case they will probably see sport.

Here it may perhaps not be out of place to give a short account of how far the fear of man exercises its effect upon the animal creation. What is it that is so terrible, even to the fiercest and most formidable beasts, in the mere presence of man in their vicinity? Upon this point there is very little difference of opinion among competent sportsmen.

It is the *scent* of the human animal, and not his appearance, which is so terrifying: for as we know, deer, antelopes, and other wild and timid game will often stand upon an open space of ground, and calmly watch a man or even a number of persons passing in the distance, when they are quite aware of what they are, without appearing alarmed. Upon the plains of Hindustan it is quite common to see black buck (*Antelopa Bezoartica*) do this, though these beautiful antelopes are by nature exceedingly shy and wary.

So also upon the American plains; in the grand old buffalo days when the prairies of the Far West swarmed with myriads of these noble animals, we have ourselves seen them on many occasions, watching us passing to leeward, for when meat was plentiful we never sanctioned a useless slaughter, but thoroughly enjoyed the sight of these magnificent herds feeding in all the glory of their pristine liberty, lords of all

* *The Overland Times of Ceylon*, weekly summary, publ. at Colombo, Nov. 21, 1894, p. 1541 (record for Nov. 15).

they surveyed. Gradually however, they would work round to windward, and then, the moment they caught the scent of man, they scoured away over the plain and soon were lost to sight.

Man, Mr. Francis Galton has justly remarked, until he has observed these things with thoughtful attention, has no idea what an object of disgust he is among the beasts, and how repulsive and frightful to them is the slightest trace of that subtile odour which encompasses the human presence about like a cloak.

When a wild beast comes across the trail of a man some considerable time after he has passed by, he in general stops, and proceeds to examine into the nature of this terrible aroma which if it be novel to his senses, causes him to smell curiously about along the trail, as if in wonderment as to the origin of the noisome effluvium, till at length fear gets the better of his curiosity, and he takes to his heels.

The elephant, the largest and most powerful of all quadrupeds for example, is well known to have in its wild state an extraordinary antipathy and dread of man; and even a child, Mr. Gordon Cumming, the well-known African hunter, informs us "can put a hundred of them to flight by passing a quarter of a mile to windward, and when thus disturbed they go a long way before they halt"—and in pursuance of the same train of thought to which we have already given expression in our remarks upon the rapid way in which the intelligence of danger is communicated by animals to each other, the great hunter goes on to observe that—"It is surprising how soon these sagacious animals are aware of the presence of the hunter

in their domain, and how quickly they move away from the dangerous neighbourhood on discovering it." *

It is probable that this intelligence is mainly acquired by the different herds when crossing the trail of the dreaded stranger, whose scent still clings to his path long after he has passed on out of sight. Mr. Selous, one of the most modern of professional elephant hunters who has written upon this subject, thus describes the conduct of some elephants which he saw come up to and examine his own trail, over which he had but recently passed—

"I saw (he says) a string of elephants walking along in single file not more than a quarter of a mile off—as the foremost, a large cow came upon our track, we emerged from the bush not 200 yards away. The keen-scented brute did not cross our spoor, but stopped dead the instant her outstretched trunk had caught the taint left by our footsteps. In this position she stood for a few seconds, moving her trunk about close to the ground and then wheeling round made off at a run, followed by the rest. From this incident, which I myself witnessed, some idea may be formed of the keenness of scent possessed by the African elephant." †

We quote this paragraph with much pleasure as an excellent illustration of the way in which the presence of man is detected by game, and the extraordinary dread which it inspires. Dr. Livingstone, the great African traveller and explorer, has not failed to notice this universal terror which the odour of man spreads among the beasts of the wilderness, and has called attention to it in several passages throughout his works,

* *Five Years of a Hunter's Life in the Far Interior of South Africa*, by Roualeyn Gordon Cumming of Altyre, 2nd Edit., 1850, Vol. i, p. 311.

† *A Hunter's Wanderings in South Africa*, by Frederick Courtenay Selous, 1881, p. 43.

as have many other observant travellers. Mr. Francis Galton, for example, is very explicit about it and says—

"a man must frequently have watched the heads of a herd of far distant animals tossed up in alarm the moment they catch his wind; he must have observed the tracks of animals where they have crossed his own, the beast that made them has stopped, scrutinized, and shunned it, before he can believe what a Yahoo he is among the brute creation. No cleanliness of the individual seems to diminish this remarkable odour; indeed the more civilized the man, the more subtile does it seem to be: the touch of a gamekeeper scares less than that of the master; and the touch of a negro, or bush-man, less than that of a traveller from Europe." *

It would be possible to furnish numerous curious and remarkable details relative to this peculiar odour of man; and to show that most of the savage tribes are themselves distinguishable one from the other on account of the different nature of their smell, even to the human nose. So also among the different nationalities of civilized man; the aroma which pervades their dwelling houses, and their towns, is so distinctly different, as to be easily noticed by an observant stranger upon first visiting their country. But however these things may be we may very safely conclude that the terror which the odour of man universally creates among the animal creation, at all events, pervades all climates and all species from the equator to the poles, and this whether the creatures have previously met the human intruder or not.

Amid the everlasting ice and snow of the higher polar regions it has been found for example that the arctic game, on first recognizing the presence of the

* *The Art of Travel*, by Francis Galton, 1st Edit., 1885, p. 156.

strange unknown aroma "showed even more terror than wild animals generally do." *

These considerations naturally lead us to the important subject of the "wind" in stalking wild and wary game animals. After what we have already said upon this subject, it must be evident that the odour of man if carried by the wind to the sensitive noses of game, at once starts them off in terror, and thus puts all chance of getting a shot at them out of the question. The universal experiences of sportsmen are unanimous in recognizing this fact.

But beyond the bare certainty that animals can detect the presence of man by their sense of smell, at a great distance, we fear little is known of a very precise nature. Both the distance at which this scent can be detected by game, and the conditions under which it is conveyed by the atmosphere, are purely matters of conjecture, upon which very little is really known, and many exaggerated accounts have from time to time been published about it. It is certain however, that under special conditions of wind and weather, animals with highly developed senses of this kind may, and can, scent man at very great distances.

In the Highlands of Scotland for instance, it is generally held that under favourable circumstances deer can wind a man on the hills, a mile away; and Mr. Grimble in his book on Deer-Stalking there, asserts that he saw deer in a gale, take the wind of a man and a pony, quite a mile and a half away, and he goes on to say, that—"so keen is their sense of smell, that for fully an

* *The Shores of the Polar Sea*, by Dr. Edwd. E. L. Moss, Surgeon of H.M.S. *Alert*, publ. 1878, p. 26 (a splendidly illustrated folio volume).

hour after a stalking party has passed by, they will not easily cross the tracks on account of the scent still hanging to them." * There can be no doubt that the taint attached to the trail, by the mere fact of a man or an animal passing over the ground, will cling to it for a considerable time afterwards. Our own noses for instance, can quite clearly detect the aroma emitted by a passing fox in a wood, long after he has gone out of sight. Personally we are inclined to think that scent carries further on breezy plains than in the forest, because the air there is not so stagnant as among the trees; but on the other hand, we are pretty confident that the taint which clings to the trail of a passing creature hangs longer to it in the forest than on the plain, for identical reasons. But as we have said, nothing of a precise nature is known about these things. What is generally believed is that there are days when, as huntsmen say, scent will lie well, and there are days when it lies badly. Huntsmen with hounds, and sportsmen who use dogs much after grouse, partridge, etc., will we think, generally admit that this is so.

There are also other curious facts in natural history, connected with scent, which are quite worth while recording here, and which show very clearly that the natural laws which govern the power of the nose among keen-scented animals, are liable to mysterious modifications, which quite surpass the bounds of man's understanding to account for; and illustrate in the most striking manner the wonderful capacity of nature in adapting circumstances to necessity, and in shielding the helpless and the weak among the animal creation from the power of evil.

* *Deer-Stalking*, by Augustus Grimble, 1886, p. 25.

We allude, among other things, to the absence of scent, in the case of the young of wild animals, during that helpless period before they have grown strong enough to be able to take care of themselves. The circumstances are so well attested by gentlemen of such known truthfulness and experience, that they can hardly be doubtful, even were there no corroborative facts which are within the reach of all who choose to observe, and give thought to these and other matters of a similar kind.

"The young (of wild game animals, says Captain Marcy, U.S.A.) gives out no scent, until it is sufficiently grown to take care of itself, and instinct teaches the mother that this wise provision of nature to preserve the helpless little one, will be defeated if she remains with it, as her tracks (*i.e.* scent) cannot be concealed. She therefore hides her fawn in the grass where it is almost impossible to see it even when very near it, and goes off to some neighbouring thicket within call, and makes her bed alone." *

This book, we may add was the recognized official handbook for overland expeditions through the prairies of the Far West, published by authority of the United States War Department; and the writer of it was an officer with great experience in all that concerned wild life in the Far West in his time. Nowhere, it may be very confidently asserted, were the habits and nature of the wild game subject to more acute observation than among the Indians, the white trappers and professional hunters who at that time roamed over these then unknown wildernesses of practically boundless extent.

* *The Prairie Traveller*, by Captain Marcy, U.S.A., New York 1859, (Published by authority of the U.S. War Department).

Colonel Dodge, U.S.A., another officer of lifelong experience in all such matters, some 20 years later writes to the same effect in what is certainly one of the best books that have ever been written upon American hunting and prairie experiences.

"It is a curious fact (he says) and an admirable example of the universal providence of Nature, that the young of game animals have no scent. In some mysterious way the dam communicates her instructions to her newly born offspring, which in quiet obedience lies motionless in the hiding place selected for it, never moving except to escape the most imminent danger. A hungry cougar, or half famished wolf, may pass or repass within a few feet of the little one, which had it the slightest scent would at once fall a victim to these keen-nosed gluttons. But for this admirable provision of Nature, in with-holding scent from the young of game animals, the races would soon be extinct." *

These facts, which were well known to, and doubtless first heard of, from those acute observers of Nature, the Indians, to say nothing of experienced white hunters who have likewise noted them, convey even to the most unthinking a wonderful illustration of the Divine goodness and mercy, so plentifully displayed throughout creation, finely expressed in the Scriptural text—"Are not two sparrows sold for a farthing? and not one of them shall fall to the ground without your Father." †

There are, moreover, other facts that can be cited, which in the strongest manner corroborate those stated by these American officers; in the case however which we have selected, they have reference to bird life and

* *The Hunting Grounds of the Great West*, by Lt.-Col. Richd Dodge, U.S.A., 1877, p. 9.

† *Matt.* x, v. 29.

the details are noted by one of our finest sportsmen of the first half of this century, Mr. St. John, than whom it would be hard to find a more acute and painstaking observer of all the little details respecting the habits and natural history of our British game and migratory birds.

"It is a curious fact," he says, "but one which I have often observed, that dogs frequently pass close to the nest of a grouse, a partridge, or other game, without scenting the hen bird as she sits on her nest. I knew this year of a partridge's nest, placed close to a footpath near my house, and although not only my people, but all my dogs, were constantly passing within a foot and a half of the bird, they never found her out, and she hatched her brood in safety." *

It has also frequently been noticed that certain birds, in a terror-stricken state, when hiding from their pursuers, seem to possess the power of retaining their scent, and in this condition the best dogs may hunt up and down close to them, without being able to find them; we have often been puzzled to account for the apparent stupidity of a good dog on such occasions, and can come to no other conclusion than that suggested by Frank Forrester, the well-known American sportsman, namely that it may be "possibly owing to some contraction of the pores of the skin and consequent check of the odoriferous effluvium, owing to alarm," but (he goes on to state) "I am rather inclined to think it is an absolute power of the bird, and arising from an exertion of will." The latter opinion however, seems to us of somewhat questionable accuracy.

* *Wild Sports and Natural History in the Scottish Highlands*, by Chas. St John—reprint of 1880, p. 24 (Originally published 1846).

Speaking of the American quail however, Frank Forrester says—

"This cunning little bird has either the power or the peculiarity of retaining the scent for some time after alighting, when it is alarmed, so that the best dogs in the world shall fail to find it"—(he supposes this may be due to an "exertion of will" only)—"since I have invariably observed during the period in which the quail gives forth no scent, it cannot be forced to rise, even on the openest ground, unless actually almost trodden on. It occurs only with unwounded birds, I have never known setters to have the smallest difficulty in finding crippled quail, or dead quail. I have even seen dogs find one dead quail among a whole bevy of wild ones which they could not scent." *

Frank Forrester then quotes cases within his experience, which he thinks prove the accuracy of those opinions with which on the whole we generally concur.

We have often noticed cases of a similar nature ourselves, but we venture to think that the reason why a dead or badly wounded bird can be readily found by the dog, is because the muscular contraction of the skin is thereby destroyed, the subtile aroma of the bird, wich we call "scent" is therefore freely given off. We shall have more to say respecting this process in our chapter on Wild Fowl Shooting, where we hope to show to our reader's satisfaction, that death or a severe wound to water-birds has these self-same results † and also instantly destroys the power of excluding water from the plumage, which as we know the duck tribe eminently possess, until it has passed into an adage to speak of some useless proceeding

* *Frank Forrester's American Field Sports*, by Henry Wm. Herbert, 1852, Vol. i, p. 269.

† See Chapter xix. of this Volume—page 425.

being "like water poured on a duck's back." Moreover if we turn to the vegetable creation, we find that under certain circumstances flowers and plants have likewise the power of retaining their scent, notably so in the case of certain classes of plants, which are scented only at night, but are odourless by day. The German traveller Dr. Georg Schweinfurth, for instance, records with great admiration the delicious aroma emitted by the desert herbage while he was encamped and lay stretched upon the ground by night in the sterile mountain region between Suakim and Sinkat, while on his way to Berber. Some of the most deliciously scented of these plants, it seems were "little obscure mountain weeds amongst which a 'pulicaria' plays an essential part." * Now, while the sun is shining with tremendous power and in fiery glory by day, very few of these desert plants emit a very conspicuous aroma, but it is often very noticeable by night—sometimes also it is brought out by wetting them. The Kus-Kus grass of India affords a good example of this latter phenomenon.

These circumstances however all tend to show, that whether in bird, beast, or plant, the natural aroma which is under ordinary circumstances exhaled by them is subject to certain mysterious laws and modifications, of which at present we have but little knowledge.

What we do know however, as sportsmen, is that the fear of man, which appears to be pretty well universal among the brute creation seems to be even more readily excited by the sense of smell than by that of vision. Many animals which will stand, as we have said before,

* *The Heart of Africa*, by Dr. Georg Schweinfurth, German Botanist, 2nd Edit., 1874, Vol. i, page 20.

and watch human beings passing in the distance, so long as they remain clearly within their field of view, will run off instantly on catching the slightest taint of the scent of man borne to them on the wind. This is so well known to all hunters of experience, and has been so often mentioned in sporting works, that it is not necessary for us to go further than merely to mention it as a matter of ascertained fact.

Birds and animals however, which have never seen man, have sometimes been found very tame, and this is generally taken as an indication that they have not, recently at all events, been disturbed by man. There have been observers on the other hand, who remark that such creatures displayed even greater terror on meeting them, than animals that have actually been hunted by man. An explanation of these contradictory reports will probably be found in the fact that in the former instance the observer spoke of animals etc., that had seen, but not smelt man; whereas in the latter case the frightened creatures had probably been approached from windward, and had therefore probably caught the wind of the terrible stranger, and the dread inspired by the scent of man caused them to scamper off in terror.

The scent of a merely strange, though harmless beast, it is well known is capable of creating unbounded consternation among timid animals or those possessing a highly strung nervous organization. The scent of a camel is thus capable of rendering horses unaccustomed to camels, entirely unmanageable. Thus Herodotus has recorded the complete defeat of the army of the Lydians by the Persians under Cyrus, upon the plains of Sardis, by a stampede created among their cavalry caused by

their catching the wind of the Persian camels. * So again the smell of a newly taken sealskin has been known to throw horses into an agony of fear—indeed this once happened to ourselves with the skin of a seal we had recently shot. Horses however soon become accustomed to camels and other strange scents when taught that they are harmless. Thus in Egypt, horses and camels are often seen standing or travelling together on quite friendly terms; and in the streets of Cairo, bands of camels pass close to carriages, without being noticed by the horses. So deer, antelopes, and other game animals will often feed near loose horses and cattle, without seeming to object to their company: on the other hand they generally avoid sheep, whose scent is very repulsive to almost all game animals.

The sense of vision as well as that of scent is however extraordinarily sharp in most kinds of game and in the case of the antelope tribe more especially, they can detect the stealthy approach of an enemy at very great distances; it is however, in the case of birds of prey, such as vultures, that the power of vision seems to be developed almost to a phenomenal degree, approaching to that of the human sight aided by a powerful telescope.

We have already described with considerable minuteness the leading facts connected with the interesting question of the unceasing watch kept up by these birds, over a large portion of the earth's terrestrial surface, as they float with untiring pinions at great altitudes in the heavenly blue; so that we need not again consider them here. Suffice it to say that this won-

* See Herodotus Book i, "*Clio*" Chap. 80. Translated by Henry Cary, M.A., from the text of Baehr, 1891, pp. 35—36.

derful system of aerial sentinels continually exercising a vigilant look-out upon everything that passes below, is maintained by vast armies of winged watchers spread over an enormous territory, which embraces almost the whole of the tropical and subtropical regions of the earth, wherever in fact the heavy forest does not interfere with their operations. As however their calling is exercised entirely by sight, and not by scent, the dense canopy of foliage in a great forest country effectually screens the earth from observation—birds of prey, of the vulture type, are therefore conspicuously absent—and those of the hawk tribe alone exist. The hawk species are however generally numerous in forests, as they prey upon the feathered tribes which in very great numbers sun themselves upon the tree tops, where in most of the tropical regions they find an abundant sustenance upon the nuts, berries, and other fruits as well as upon the countless legions of insect life which there luxuriate under the full influence of the solar rays. Such fruits and flowers grow and ripen in abundance not only upon the great trees themselves but also upon the infinite multitude of creepers which spread themselves over their crowns in the full glory of prolific Nature in these climates. Hawks will also sail down through the branches and snatch their prey even from the ground itself: the forest may therefore be regarded as the principal hunting ground of many of the hawk tribe, its inmost recesses being almost everywhere vigilantly hunted by these keen-eyed plunderers.

While however the forest, both by day and by night, is constantly the hunting ground of the sharpest eyes in existence, owned by birds of the hawk and owl species, it is a noteworthy fact that it also forms the

natural habitat of all the largest and heaviest quadrupeds,* in whose case the sense of sight seems to be limited, almost in inverse ratio to their size and strength. None of these immense beasts are gifted with keenness of vision—this is so in all the leading varieties, as the elephant, the rhinoceros, and the buffalo—while on the other hand the smaller and weaker quadrupeds which are unable to protect themselves by their personal prowess, are usually endowed with particularly sharp eyes.

Animals which are livers upon the plains country may however on the whole be considered much more keen-sighted than dwellers in forests, as they have only their sharp eyes and speed to depend upon, to escape from impending danger, and are unable to take advantage of cover in the way that forest animals are able to do, or to rely upon their skill in hiding, as the latter do so skilfully.

In accordance with the great law of the survival of the fittest, Nature has therefore evolved the keenest eyes among her creatures inhabiting the open plains.

There is however, one notable exception to this rule, namely that of the American buffalo or bison, (*Bos Americanus*) another heavy and powerful animal which can trust to its great physical strength to beat off an assailant. The bison is therefore much less well endowed with eyesight than any of its weaker companions, and may on the whole be considered decidedly a dull-sighted beast.

Moreover animals of the deer tribe which are mostly

* The bush forest or jungle is intended to be included when speaking of the forest here, and not merely the heavy forest of large-sized trees.

habitants of the woods, though in some respects exceedingly keen-sighted, and able instantly to detect any object in motion, are often singularly stupid in making out an enemy (such as the human hunter) when they are on the move and coming up towards him. On these occasions, provided the hunter is stationed to leeward and that there is nothing in his dress to attract attention, if he remains perfectly still, almost all animals of the deer species will very likely fail to observe him, and will often almost run up against him before they make out what he is.

It is probable that they have taken him for a tree-stump, or some other inanimate object in the landscape; this peculiarity of deer should always be borne in mind when such animals are seen running down wind towards one: no matter how fully exposed to view the hunter may be, his policy is to remain absolutely motionless, and await the progress of events, for if he moves he will be instantly seen. On the other hand with animals of the antelope tribe, on the plains, such tactics could hardly be adopted with a reasonable chance of success, as these keen-eyed creatures will make out the human figure instantly at very great distances; the hunter's chance in such a case is to lie down before he is observed and adopt some one or other of the expedients which will be noticed in our next chapter.

The foregoing details bring to the front another important point in forest hunting, namely the necessity for every now and then stopping to listen, and to take a good look round. Forest animals, it should be remembered, depend to a great extent upon their acute senses of scent and hearing, to warn them of

approaching danger. Time so employed is therefore seldom thrown away, and we feel confident that more game is lost by hurrying forward over the ground, than by any reasonable amount of watching and waiting, when traversing localities where game is likely to be come upon. In fact in the mornings and evenings, when game is on the move, it is very often an excellent plan to station oneself at some point of vantage, where well-worn paths, or runways, show that game frequently pass that way, and seating oneself comfortably on a fallen log, to wait for game to come to one, instead of going oneself in search of it. All noise necessarily made in making a way through the bushes, is thus avoided. This practice is very generally adopted by those masters of the hunter's craft, the North American Indians, who have a thorough knowledge of the whole country, and an intimate acquaintance with the habits of all game animals; they are thus almost always able to select a stand where game may be killed in this way; it therefore often happens that the white hunter will range the woods for an entire day without getting a shot, while the crafty redskin, without fatiguing himself in the least, will bring home deer or other game, day after day, as the result of his superior knowledge of wood-craft. This constant success of the Indian hunter often occasions no little surprise in the minds of Europeans and others, who being unacquainted with such stratagems, are unable to understand how it comes to pass that the red man, with very inferior weapons, is usually uniformly successful, while the white man fully furnished with all the newest means and appliances of sport, and who is as a rule a much better shot,

frequently comes home empty-handed. One common solution of the enigma is explained as above; indeed when the cover is exceedingly thick, and the weather still, it is often useless to go crashing through it, because the hunter's approach is then almost certainly betrayed by the noise, long before he can get within sight of game; the ambush policy in such case therefore becomes the only feasible one—there he can watch and listen, without being himself seen or heard.

Upon taking up his stand to watch for the coming up of game (whether with or without beaters to drive the cover towards him upon the East Indian plan) the very first thing to be done is to scrape a spot sufficiently large for his feet entirely clear of fallen leaves, dead twigs etc., otherwise the movements of his feet are apt to be heard by any game which may be coming towards him. Wild and wary animals almost invariably advance slowly, with stealthy, noiseless motions; stopping frequently to listen; so that the slightest noise of rustling among leaves, etc., will be almost certain to cause them to turn away, and go off in another direction. Another important point to be attended to, is to see that there is some tree or other object behind him, which will prevent the sportsman's figure being visible in outline against a vacant background, in which case he would probably be at once observed by a sharp-eyed beast, before the hunter could catch sight of it, and again in such case the game would slink away unheard and unseen. To secure a good background is therefore in many respects even more important than to have a screen of bushes, or other such objects, in front, as the latter can generally

be seen through: the most efficient screen in front therefore is a rock, or bank of earth, or else low dense tufts of thick grass or ferns—something in fact that is not transparent; in any case, if the hunter's dress harmonizes well with the background and its immediate surroundings (a thing he should always strive to effect) he will probably not be recognised as a man, provided he stands perfectly motionless. This he should always do, as far as possible, once he has completed these preliminary preparations, remembering how instantly game catch sight of anything in motion.

If there are several directions by which game may as likely as not come up (as is generally the case) the sportsman should take care to face towards the right of the position, because if game happens to approach from the left, he only requires to turn a small portion of the body, as on a pivot, to command the left approaches—whereas if he is facing left and game appears on the right, he will be obliged to turn the whole body, to bring his rifle to bear in that direction.

There is a great art in watching ground, to keep in constant view all the avenues by which an animal is likely to creep up; the movements of all kinds of living creatures should also be closely observed: a frightened bird suddenly rising out of a thicket, a hare or other small animal stealing away, as if to escape some hidden enemy: those and all other movements of a similar kind among the forest creatures, may as likely as not prove the forerunner of nobler game. There must be some cause for these movements among the minor inhabitants of the wood. In India for instance, the startled cries of peacocks or

the "swearing" of a troop of monkeys, who have viewed the crouching tiger, has frequently proved the prelude to the appearance of "the great cat" himself.

On the plains, as we shall hereafter have occasion to show, this practice of watching for game is generally exclusively carried out at night; in the forest however, it is only on rare occasions that night shooting is practicable.

This is one of those essential points of difference, which distinguishes the methods of hunting in the forest and on the plain; it is seldom of much use to wait for game to come within shot, upon the open plain by day, unless ravines, or other natural cover afforded by the landscape, assist the hunter in his object.

When however the hunter is employed in ranging the country in search of game, both by forest and by field, the same care must constantly be taken to avoid exposing himself when approaching the crest of any hill or rising ground; on top of which the hunter should always avoid showing himself until he has thoroughly examined the country in front, to see if game is lying there. Neglect of this precaution is a very common cause of non-success in hunting.

It must be remembered that when game is thus incautiously put up, it is apt to rush off in a panic, and the alarm is communicated to every animal within sight or hearing, which is at once placed on the alert. The frightened rush of an animal, or even the startled cries of a bird suddenly flushed from its resting-place, are things thoroughly understood by every kind of game, which thus instantly becomes aware that something is astray.

It is however much more difficult to carry out that excellent maxim, that the hunter should see his game before the game sees him, in forest hunting, than it is in the open country; not merely because of the cover which the undergrowth affords, but also because during the greater part of the day, especially in hot climates, forest animals make a practice of lying down among brushwood, or other thick cover, generally in such positions, that while hidden from view themselves, they can keep a considerable portion of the adjacent woods under observation, and most animals when they lie down make it a regular rule to do so looking down wind. All the more wary kinds of game are almost certain to do this; they can then see the approach of an enemy coming up wind, while they are instantly warned of his presence by winding him should he pass to windward. The smallest sound of crackling of dry leaves, or the snapping of a rotten stick, made by the hunter, is also sufficient to give them the alarm, in which case as soon as they have satisfied themselves as to the direction from which danger comes they glide silently away, long before the incautious sportsman has got near enough to catch sight of them. It is also a common trick of moose, elk, bear, and other sagacious creatures, to make a half circle to leeward of their original trail before lying down, so that an enemy following upon the track will necessarily pass near where the wary beast is lying—his presence is thus at once detected by the wind, or by any slight noise he may make, and while he follows up the trail his quarry is with stealthy footsteps running off at a tangent, rapidly giving a wide berth to the dangerous locality. This clever stratagem of these wary creatures,

would almost seem to savour more of reason than of instinct; but so many well-authenticated instances of its having been done are recorded, that it may be very safely accepted as a matter of authentic fact, and as such it is very generally acted on by the Indians, who when following the trail of a moose make a point while advancing of making a series of detours or circles to leeward, which cut in upon the track here and there, and yet keep the animal to windward of them. By this means they frequently succeed in outwitting the wary beast by outmanœuvring him in his own tactics.

The places where game generally make their beds in the forest vary according to the nature of the climate and country, and even to the time of year, but as a rule it is usually among thick bush, or on the edges of heavy windfalls, especially where a growth of young trees has sprung up among the fallen timber.

Another favourite place is on dry spots among sloughs and swamps, where long grasses, canes and brushwood afford convenient hiding places; when the weather is hot, and the flies are bad, the margins of lakes, pools, and rivers are very favourite places of resort—but as a rule, wherever their resting places may be by day, if game are much disturbed by hunters, they are proportionately far removed from their nightly feeding grounds.

Many animals make a regular habit of travelling considerable distances in this way, both morning and evening, and they rarely return a second time to the same spot; they therefore cover a large area of ground in the course of their wanderings to and fro, especially where water is scarce. In countries where flies are very bad, most of the game is however driven out of

the thick bush by these pests during the fly season. Game will then constantly be found in open spaces, among heavy patches of fern, or where there are mountains or hills, upon bare ground on the higher wind-blown slopes, among rocks and large stones, or beneath the shade of scattered trees and bushes. Bushy ravines and stream beds, which seam the sides of most mountains, are also frequent places of resort at these times, together with detached patches of dwarf bush and other cover. If the hunter is accompanied by attendants it is often a good plan to walk along to leeward of these places, and by merely sending a man round to pass along to windward, and make a certain amount of noise, any game hiding in these places is apt to come out on the side where the gun is, or to try to escape down the gully through the bush. The sportsman should therefore take care to keep well ahead of his beater, and in certain sorts of country which is unfavourable for stalking game in its lair, a good many shots may be obtained in this manner, which probably could not be got in any other way. They will however be necessarily mostly running shots.

In hot weather when flies are bad, some kinds of game will at these times resort to the waters, and lie down in the shallows, with only their heads out. The true buffalo of all kinds are particularly addicted to this practice. On the banks of the Nile for instance, it is quite common to see the tame buffalo of Egypt, which we believe to be the same animal as the wild one in the domesticated state, lying in the river, with merely the face and nose uncovered. These animals will also wallow in the mud of swamps, until the whole body is encased in a thick covering of mud, which

serves both as a protection against flies and against the sun.

In Ceylon, buffalo are almost always in the swamps, or lying in water, during the daytime, in hot weather. On the other hand in very cold weather, in the American forests, game retire when lying down almost entirely to the densest cover, as a protection against the cold; they are however more apt than usual at such times to feed during the day; if possible in sunny spots. In hot or mild weather however, most of the forest game, as we have said, lie up for the greater part of the day, and feed in the early mornings and evenings, and are also often on foot during the greater part of the night, especially when there is bright moonlight.

The time when game go to water varies with the climate and locality. Where water is very plentiful, it is probable that they have no fixed hours or regular drinking places, but take water wherever and whenever they fancy it. But in hot dry climates, they usually resort to the water holes and fountains in the evenings, shortly after dark, where if they are much persecuted by beasts of prey, they very generally resort in troops, and only stay a very short while at the water—because it is there that beasts of prey are certain to lie in wait for unwary animals. Their object in collecting in troops at these times is evidently an instinct of nature, which teaches them that there is safety in a multitude: and at all events, being in company gives them a certain sense of security. Consequently in this class of country the trails leading down to watering places are generally very clearly marked, and show that it is the practice of the game to come down to the drinking places in companies, by certain well-defined routes. When water is scarce,

animals and birds will often travel long distances to reach it; and animals which inhabit this class of country do not usually require water *daily,* but only resort there when pressed by thirst, every second or third day, according to circumstances. They then approach the water only with the utmost caution, constantly beset by the dread of meeting beasts of prey, and usually choose the leeward side, so that they can detect the presence of enemies near the water by their sense of smell. While drinking, it is the invariable practice of all the smaller and weaker animals to post sentinels to give warning of the approach of danger; and as soon as possible they get away from the dangerous neighbourhood.

These circumstances, as we have already mentioned will account for the great quantity of tracks, which are so frequently to be seen near watering places in dry countries.

With the exception of these troops of game, which sometimes resort to springs etc., in dry regions, anything like regular herds of game are uncommon in heavy forests, where the animals are seldom of a gregarious nature, but are usually met with either singly or two or three together; small bands of half-a-dozen may however occasionally be seen, but the numerous troops which assemble upon the plains or in the bush country, where patches of dwarf trees alternate with stretches of open ground, are exceedingly rare in great forests, and probably only occur during migratory movements of game.

Great herds of game do however occasionally assemble; for instance the late Mr. George W. Sears, who wrote under the *nom de plume* of "Nessmuk" in the

United States, and who was quite an authority on matters of woodcraft, and forest hunting, mentions a case of this kind, which he happened to observe in the Michigan forests, where he once saw "such an aggregation of deer, as a man sees but once in a lifetime."—"It was (he says) a magnificent army, and I shall never look upon its like again;" indeed speaking of his more recent experiences "Nessmuk" expressly states—"The largest drove of deer I have seen in twenty years consisted of seven only." *

It is probable that this great herd was therefore a migratory band of deer travelling from one district to another; and though his latter experiences may have been somewhat unfortunate in the quantities of game met with, they in the main bear out our contention as to the infrequency of game consorting in numerous herds in forests, though certain districts will naturally be found to contain considerably larger quantities of game than others, and there deer and other animals may be quite numerous, and scattered as they are over the wood, frequently afford capital sport to a clever hunter.

Most authorities on sporting matters are agreed that the early hours of the morning are the best for hunting, as all grass or tree feeding animals are pretty certain to be on the feed at daybreak, and occasionally for some hours afterwards. Exceptions to this practice occur most usually in tropical lands, where experience shows game generally retires to lie down for the day, early, and before the sun gets hot, which it does soon after eight o'clock; also where game is much harrassed by pot hunters and others, animals

* *Woodcraft*, by Nessmuk, published New York 1884, pp. 125—6.

are apt to feed more by night than during daylight, and get themselves away to their lairs with the dawn. Depredations to growing crops in gardens and fields, when human habitations are near, are also almost exclusively committed by night: and long before daylight the plunderers have retired to their fastnesses in the forest.

So serious are the depredations of game to crops in many wild countries, that at the time when the grain is growing, considerable numbers of the population are obliged to sit up by night to watch their fields, so as to save their crops from destruction; and did time or space permit, many curious legends might be related of the hardships which the native farmers are exposed to in endeavouring to carry out this duty.

All over India for instance, in districts lying contiguous to jungle tracts, it is the usual practice for the native cultivators to post watchmen to protect their fields from wild animals, by night, when game is numerous. These men keep up a continual clatter throughout the hours of darkness, to scare away these unwelcome intruders, from whose visits the advent of the dawn alone brings relief; for the jungle animals are cunning enough to know that they carry on their depredations almost with impunity, so long as their movements are concealed under cover of darkness, but they are always most careful not to allow themselves to be overtaken in their forays by daylight, by which time they may be miles away from the scene of their predatory excursions of the previous night.

Where heavy game are known to visit cultivated lands in this sort of way, many a good night's sport may be got by watching for them at places to which

they are known to resort, but this description of sport will be best considered in our next chapter on hunting in the plains, where the subject of night-shooting will be duly gone into.

Where a state of things such as has been here described exists, the habits of the game will generally be found pretty well entirely nocturnal; and it will be but seldom that any of the heavier and wilder animals will be visible after the day has broken. Such districts are also generally infested by numerous beasts of prey, according to locality; such for instance as the tiger and the panther in India; or the lion, the leopard, etc., in Africa; but in most countries it is almost hopeless to attempt to get shots at this latter class of animals by daylight, unless they are hunted for, and driven out of cover by elephants or a small army of beaters, as has been the practice from time immemorial in Bengal and other parts of India: because the habits of the larger beasts of prey are strictly nocturnal: they mostly lie in wait for their prey at drinking places, or on paths which they are known to frequent by night, and when they kill a beast they generally do so in the night; a hearty meal is then made upon the carcase, a visit to the water usually follows, and then they are off again to their lairs.

It is only in very wild districts, remote from the dwellings of man, where firearms have as yet been seldom used, and where the wild beasts of the field still roam in all their pristine state of savage liberty, that beasts of prey, such as the lion, continue to roam about fearlessly by day; for though their nature may be ever so ferocious where timid and mostly helpless victims are concerned, the personal daring of really

dangerous beasts of prey is usually in almost inverse ratio to their size, and strength: there are in fact no creatures which are more careful about their own safety than they are. This we venture to think has been sufficiently proved, by the extreme rarity of attacks upon sleeping travellers by night, in the interior of Africa, and other places where such animals were known to be extremely numerous—yet men have been known to pass years of their lives, sleeping nightly on the ground, in security, while troops of lions and other dangerous beasts of prey were to be heard, almost as regularly as the darkness closed in, moving around them and uttering their respective cries in the vicinity of the camp; and in those exceedingly rare instances where men have fallen victims to the nocturnal attacks of these creatures, it has almost always been in consequence of the neglect of the most obvious precautions, or because the assailant was driven by hunger, in consequence of the game suddenly deserting a district from failure of grass, or other articles of their natural food. Then, as we know, animals emboldened by hunger will become exceedingly daring, and will run risks which they would not otherwise dream of incurring.

We make bold however to assert that the fiercest beasts of prey will not habitually venture upon the daring incursions nightly made by so called shy and timid animals, like deer, simply in order to attain some coveted delicacy, not at all a necessary article of diet to them, but which can only be obtained by creeping silently in at the dead of night, among the dwellings of men. These beautiful creatures have often been known to commit robberies of surpassing audacity,

upon the enclosed gardens of people resident in thickly settled districts, which it must have required a vast amount of skill and daring to accomplish, jumping or boring their way through fences, which would apparently have been amply sufficient to set their efforts at defiance—and they have continued to do this night after night, for a long time, before tardy "justice" has at length overtaken them, in the shape of a bullet or a handful of "slugs" from the indignant householder's musket.

It is however quite exceptional for the larger and more dangerous beasts of prey to exhibit such audacity, and they in general confine themselves entirely to attacks upon cattle, or other animals from whose resistance they have nothing to fear. But there is probably no game so hard to get a shot at, or to get a sight of, as the larger beasts of prey where sportsmen are known to be about. These animals will then seldom return to the same quarry at all after making their first meal upon it; or if they do so, it will only be done with extraordinary precautions to avoid a hidden enemy. They will stop and start at the rustling of a leaf, and hie themselves away on the slightest appearance of danger, quite as timidly as the gentle spirited deer.

Sometimes however, as we know, a tiger or other beast will become a man-eater; and having once turned his talents in that direction will frequently become a veritable scourge to a wide district of country.

How this comes about it is somewhat difficult to explain, and must always be very much a matter of conjecture; but probably if we were to hazard a guess

about it we should say, in the first instance the human victim has fallen while the animal was endeavouring to make good its escape from some imaginary attack, and having once come off an easy victor in the encounter, success has bred contempt of the human race. In most cases however the victims are women or aged and helpless persons of either sex, who have been incautiously out alone after dark, in a country infested by a man-eater.

Attacks, even then, upon Europeans or men with guns, are very rare; and published accounts of such cases show that there is no more shy and difficult game to outwit than a man-eating tiger, which seems to have an instinctive dread of the death-dealing rifle, and to know quite well that his cannibal propensities are certain now-a-days to provoke reprisals by the Shikari. Very complete returns are now made by the Indian government, of the number of persons annually killed in British India by wild animals. The numbers are still, we regret to say, very large; in the four years 1885 to 1888 inclusive, they amounted to a total of 9485 persons. *

The number of cattle destroyed in the same period, by tigers and leopards only, amounted to the enormous total of 204,493, † while the smaller carnivoræ annually kill some 12,800 additional animals among them.

The numbers of cattle destroyed are also increasing, whether by reason of more complete returns being attained, or otherwise, is not stated. For instance, whereas in 1885, 46,469 head of cattle were killed by

* Indian Govt. Returns of deaths caused by wild animals.

† Statistical Return of cattle destroyed by wild beasts in the 4 years 1885 to 1888 inclusive.

tigers and leopards, the number had risen in 1888 to 50,302, destroyed by the same animals. * The depredations of beasts of prey are however more general throughout the world than people might suppose, though it would be impossible in these pages to discuss such matters at any length. We may however just say that though no reliable returns are available, everywhere in Africa their devastations are very great—so great indeed, that in some parts the keeping of domestic animals of any kind is only carried out under the greatest difficulties; the blood-tax too upon the human population is also very serious. Take for instance, the numbers of cases of attacks on natives in Somali Land, noted by Lord Wolverton during a trip of only five months. In Somali Land lions and other beasts of prey seem to be extraordinarily numerous and bold; and the sport to a great extent consists of lion shooting—16 of these animals having been killed by his lordship's party. It appears that the destruction of life by man-eating lions is there so common that it has come to be regarded as unavoidable, the natives having neither proper guns to kill these animals, nor inclination for the business, like all Mahometans regard the loss of life as "Kismet" or the Will of Providence, which it would be vain, or even sinful, to resist; it is only when a "big man" or chief is killed that any effort is made to hunt a lion. † But coming much nearer home to civilized lands, where the larger carnivoræ, (if they ever existed in historic times) have long been extinct, we find that considerable losses of human life

* The returns exhibited are as follows—1885, 46,469—1886, 46,044—1887, 51,678—1888, 60,302; total 204,493.

† See *Five Months in Somali Land*, by Lord Wolverton, 1894 (various pages throughout the book, especially pp. 32 to 35).

still periodically occur from wolves, and other minor carnivoræ. For instance, in Russia these losses cannot be placed much under 1000 per annum. Then again in Hungary, where extensive forests still exist—

"The *Wiener Allgemeine Zeitung* of Feb. 10, 1891, publishes intelligence from Szolnok (Hungary) of the depredations of a pack of wolves on the estate of Baron Wodisner, in Szandau, which had attacked and killed over 20 peasants, the unfortunate men having been entirely devoured, with the exception of their feet and boots." *

The winter of 1890—91 was one of the severest known in Central Europe for many years, and no doubt the cold and want of food drove these animals to desperation, for only a fortnight afterwards the London papers record a further loss of 4 lives in Hungary. In one of these cases two clergymen of the Greek Church at Temesvar were the victims—they were out driving in a sledge driven by a coachman with two horses, when they were pursued by a pack of wolves, and though the coachman drove at a furious pace, the wolves overtook the sledge and jumping up upon the back of it, they dragged the priests off, and devoured them; the coachman and horses however, managed to escape with their lives. Next day two watchmen who were on duty on the outskirts of the city were also killed, presumably by the same pack. † Even in France these animals are still occasionally troublesome, and from official returns it appears that in 1887 two persons were attacked by them. A reward is still offered by the French government for their destruction, and it seems 900 were killed in 1885, 760 in 1886, and

* See the London *Times* of Feb. 11th, 1891, Reuter's telegram.

† *St. James's Gazette* of Feb. 25th, 1891.

701 in 1887, during which years the French government paid premiums for their destruction, respectively amounting to £2610, £2284 and £1920. *

These facts will give an idea of the trouble still caused by wild beasts even in Europe, and the amount of damage they continue to do both to person and property. In all wild countries, as may readily be supposed, matters are infinitely worse; for instance telegrams from Winnipeg (Canada) dated Feb. 31, 1891, state that news had reached that settlement that a band of Indians encamped on the shores of the lake had been attacked by a pack of 200 ravenous wolves, and 18 men, women, and children were devoured, only two escaping to tell the tale. † When we were out in the Hudson's Bay Territory (as it was then called) some 35 years ago, such stories were common, and though so large a number of persons perishing together is unusual, the numbers who met their deaths from famished wild beasts in snow time every winter, was considerable.

In the teeth of such events, it may therefore occasion surprise to see it stated that beasts of prey are in general, as we have stated, very timid creatures when they come into contact with man—nevertheless we think we shall be supported by the general concensus of opinion among travellers of experience, when we say so, with regard to them on ordinary occasions: though starvation as we know will sometimes drive even the most timid to desperate actions.

How completely the sense of fear is at times overcome by want may perhaps be better illustrated than

* London *Times* of Dec. 26, 1888.
† See English Newspapers of Feb. 13, 1891.

in any other way, when we mention that during a terrible drought in India, a hare actually came up, entered an officer's tent at a military encampment, and drank out of a vessel held in the hand of the adjutant of one of Her Majesty's regiments at Ellore. *

But be those things as they may, to the sportsman birds and beasts of prey being present in great numbers is always more or less a welcome fact, because it may be regarded as an unfailing proof that game is also abundant, seeing that these creatures in a wild country must, in the absence of domestic cattle, etc., have game to prey upon. Moreover the larger and fiercer carnivoræ are themselves much sought after by sportsmen as trophies of the chase, and as such, as we have said, often require the exercise of the highest skill on his part to bring them to bay.

Tiger hunting, and the pursuit of other beasts of prey, is more or less strictly speaking a form of forest and jungle shooting, because the haunts of these animals, where they have to be sought after, are generally in forest wooded ravines or other heavy cover. Yet like much of this sport, it is only obtained on the edges of the forest, where these adjoin the plains country, or where extensive clearings have been made by man within the forest boundaries; for in the heart of vast forests which extend without a break over a wide section of country, the larger beasts of prey are scarce and rare, and probably even entirely wanting—though the smaller species, such as wolves, foxes, and the smaller cat tribes, penetrate everywhere through the

* This circumstance is vouched for by the late Mr. Chas. Darwin who had it from Dr. Malcolmson (See Journal of his researches during the Voyage of H.M.S. "*Beagle*," foot-note to page 133—14th Edition, 1879).

woods, as also do certain sorts of bears—but unless emboldened by hunger, all these animals are extremely wary, stealthily avoiding the approach of man, and when they are come upon it is mostly unexpectedly, both on the part of the man and the beast.

The tracking of all these to their lairs is an arduous work requiring the aid of a skilled hunter, as both the ears and noses of these animals are particularly keen, and the slightest crackling of a dry stick will set them off.

Now as regards noises in the forest, questions here arise of high importance, from the hunter's point of view. We have ourselves no doubt that noises are heard there more readily, and at a greater distance than elsewhere. In fact it is practically certain that slight sounds, such as the rustling of dry leaves, the crackling of twigs, and other rubbish under the human foot, the switching of branches catching in his clothing, or the slight packing noise made by the hunter's feet in snow time, which would hardly be noticed in the open country, are audible to the keen ears of game at extraordinary distances in the forest.

These things are very seldom alluded to, except in general terms, in books that profess to treat of sport in a forest country. Mr. Van Dyke however has stated his opinions of such matters, and says —

"It is probable that sounds can be heard a trifle farther in the woods" (than elsewhere) "owing to there being less wind, and some cover overhead. At any rate it seems so, with noises not too distant, though the point is a hard one to prove." *

* *The Still-Hunter*, by Theodore S. Van Dyke, New York 1888, p. 44.

The absolute stillness of a great forest, in certain conditions of the atmosphere, is one of those things that a man must have felt and experienced in his own person, before he can appreciate it; nearly every writer upon sporting or travelling through such localities seems to have been struck by it.

As a rule the great forests of the world are not made bright, like our English woodlands, by the merry twitter of small birds; at home we rarely go far through the trees without catching sight of a rabbit or two, or some other species of small game, either furred or feathered, however insignificant; but in the great domain of Nature's primeval woods, these petty details seem to be, as it were, swallowed in the vastness of the interminable wilderness of trees, where the voice of the bird is usually conspicuously absent: indeed experienced woodsmen regard the presence of these songsters as indicative of the neighbourhood of human habitations, round which, it is a fact attested by many travellers of authority, these birds congregate, following in the train of human occupation, and making their haunts near houses and villages. This for instance was the constant experience of Dr. Livingstone in his African travels, who states that though "birds of song are not entirely confined to the villages, they have, in Africa, so often been observed to congregate around villages, that when we approach the haunts of men, we know the time of the singing of birds is come;" * and the great doctor even goes so far as to assert that when native villages are deserted by their human inhabitants (a thing of frequent occurrence in

* *Expedition to the Zambesi*, by David Livingstone, publ. 1868, p. 65.

Central Africa) they are also quickly deserted by the birds. *

It may be that this is due to the fact that scattered scraps of food thrown out by the natives, or growing crops in their fields and gardens attract these birds, or that the presence of man drives away their enemies; but at any rate the fact of their following the human habitant is well known, and we shall have more to say upon the same subject in our subsequent chapter on "Wildfowl."

Thus therefore it comes that in the heart of great forests, where man has no permanent place of abode, these leafy solitudes are in general in still weather wrapped in a silence almost equalling that of eternal sleep.

This mighty hush of Nature, before it is broken in upon by the busy sounds of human labour, has been very beautifully described by Alexander Pope in the opening lines of his "Essay on Silence," in these words —in one of the most striking pieces written during his boyish days

"Silence! coeval with Eternity
Thou wast, ere Nature's self began to be.
'Twas one vast nothing all, and all slept fast in thee." †

When this condition of absolute stillness is present, it is a bad chance for the hunter, especially in the great tropical forests, where many of the fallen leaves are of immensely strong thick fibre, so that when dry it is almost like walking upon tin plates.

The great leaves of the teak as well as those of nearly all the Ficus tribe and numerous other trees,

* *Expedition to the Zambesi*, by David Livingstone, publ. 1868, p. 65.
† *Essay on Silence*, by Alexander Pope (*Tempo* 1708), 1st verse.

will readily occur to the mind of the Indian sportsman as examples of these noisy debris, which render moving about without noise a matter of impossibility in many places. Mr. Van Dyke in like manner warns American still-hunters about to take the field, of these difficulties—"First let us see (he says) whether the day will do for still-hunting;" for he reminds them there "are days when you might almost as well stay at home, though even on such days it will pay you to go out, study the movements of deer, and the 'lay of the land.'" * The latter suggestion is a good one, and helps a stranger to make his experience; there are however two other things a hunter may do on such occasions: he may post himself at advantageous points, concerning which we shall have more to say presently, and wait for game; or he may go to the lakes and streams, and try for birds, or taking out some fishing tackle in addition to his gun, he may try for fish. In a great forest, especially where dangerous animals may be met with, or natives of doubtful character possibly be come upon, it is a bad plan to go unarmed. *Never do that.*

Now as regards a man's movements when hunting after game in the forest, it is necessary to determine how he shall manage to range through the woods without frightening the sharp-witted forest creatures, who from the smallest to the greatest will all, so far as our experience goes, avoid him if they can.

He must so manage as to see them before they see him. To do this, he must see that they do not get his wind; and he must not make a noise while walking

* *The Still-Hunter*, by Theodore S. Van Dyke, NewYork 1888, pp. 58—59.

or they will hear him, and slip stealthily off before he has a chance of getting a sight of them.

This will oblige him to see to his footgear. Heavy hob-nailed English shooting boots are too noisy for forest hunting, except in wet stormy weather. We have tried several expedients to counteract this fault such as putting on covers of raw hide etc.—but this renders walking in them very fatiguing. Then, the Red Indian moccassins, besides becoming useless in wet weather, destroy the feet of persons who wear boots, and soon cause great pain to the joints of the large toes, which being unsupported by a hard sole as in a boot, soon get strained;* because the white man walks with, his toes turned out which throws the whole weight of the body in walking on the big toe. This is the reason why American Indians, and indeed all barefooted savages, and sandal-wearing natives, habitually more or less turn the toes in while walking. This matter the reader will find treated of more at length in another portion of this work. Meanwhile reverting to the question of hunting shoes—we have taken much pains to consult a number of the best authorities on the subject, and find that the majority of those best qualified to judge of such matters generally agree that light pliable soled footgear are the best for stalking purposes—except of course on very rocky ground, where the strong hob-nailed British shooting boot sometimes becomes all but indispensable, as light shoes etc., soon get destroyed, especially if the ground is very wet. There are some evident objections to shoes,

* We are borne out in this opinion by Mr. J. K. Lord.—(See his *At Home in the Wilderness*, p. 143; but Mr. Van Dyke is all for the Indian moccassin—See his *Still-Hunter*, 1888, chap. xxxiv, pp. 380—81).

bits of gravel and other rubbish being apt to get into them. In rainy weather during the Franco-German war of 1870, for instance, the French infantry suffered much from wearing shoes over which the mud worked its way, and caused much distress and many sore feet —a very serious matter either to sportsmen far out in a wild country, or to soldiers during a campaign. For broken weather, and some sorts of rough grounds, especially where snakes are numerous or where there are grass leeches, jiggers or bad stinging ants, boots are to be preferred to shoes; but where there are no special reasons against them, these shoes have the great advantage of being light, and easily taken off and put on: and the better class of brown leather lawn tennis shoes, with thick smooth red vulcanite rubber soles are about the very best class of footgear for stalking purposes. On the steep slopes of the Himalayas, Col. Kinloch says he finds "they give a better hold on nearly all kinds of ground than any other material. They do not even slip on dead pine leaves, the most treacherous material on which one can walk." Those with grey corrugated soles were found to wear out very rapidly. *

The same accounts come from Central Africa; when used in the forests there, in elephant hunting these shoes were found very serviceable, and much more noiseless than boots, so that by their means the hunters were often able to approach quite close to these wary beasts without being heard.

Attention to the colour of the dress is also very necessary, in order that it should harmonize well with

* *Large Game Shooting in Thibet, the Himalayas and Northern India*, by Col. Kinloch, Calcutta 1885, p. 212.

the prevailing tints of the surrounding forest and background. This must be left mainly to the common sense of the individual, and it must be remembered that game will be liable to see him passing in front of the tree stems, as well as against the general background; for this reason therefore in snow time, a white dress does not do well in the forest, as it is easily seen in crossing the foreground, with dark tree stems rising out of the snow behind. Personally we are inclined to believe that a whole suit of the same material is not a good thing, because it shows out the perfect outline of a man, whereas by having say a grey cap and trousers, and brown coat and vest, or *vice versa*, it cuts the figure in two when seen a little distance off, and does not therefore produce so distinct an outline of the human form as a self-coloured suit.

This was the opinion of the late General H. H. Crealock, who pointed out this fact very clearly in his work on deer stalking in the Scottish Highlands;* it seems to be very much a matter of common sense, and though the question may assume greater importance on bare plains or upon a mountain side, than in the forest, still no precaution should be neglected in stalking wild game, as success to a great extent depends upon attention to small matters of detail. †

* *Deer Stalking in the Highlands of Scotland*, by Lieut.-Gen. Henry H. Crealock, C.B., edited by his brother Major General J. N. Crealock, 1892, p. 192.

† For soldiers' uniforms on active service, perhaps we may be permitted to observe, that when bodies of troops are acting together, all such contrasts act adversely—and have the effect of marking out a line, which would help to direct hostile fire. Thus French infantry always make a clearly defined *double line*, one for the blue coat, and a second

In forest hunting one can never be certain that one may not be within view of game, which may be standing or lying among bush concealed from the hunter's notice, but out of which they can see much better than he can, and as a matter of habit often keep a considerable area of ground under observation. The hunter may therefore at any moment pass within plain sight of game, but if the colour of his dress harmonizes well with that of the landscape, and he makes no sudden movement which attracts attention, it may frequently occur that he will not be observed, because the game, though seeing, may not recognise what he is, but take him for some natural object in the landscape, such as a rock or a tree stump. A good illustration of this fact occurs when game comes unexpectedly in sight, advancing towards the hunter; every sportsman of experience is aware that deer and other animals will then, as we have already shown, provided he only remains motionless, frequently come quite close up without observing him.

This brings us to the question of how it is that game most frequently catch sight of an enemy; and we trust before we have done with it to be able to state a number of interesting facts about it. It can however, hardly be doubtful, that it is because their eye instantly detects anything in motion.

The moment that their attention is thus attracted, their keen sight generally enables them readily enough

for the red trousers—if the képi is of a third colour, it again makes another line, so will a white belt or any other showy accoutrement. Every one of these things "makes a line" when seen at a distance on a number of men. We feel sure however that in the next great war British uniforms will be carefully attended to in this way, so as to avoid the errors of former days.

to make out what it is that made the movement. Every sportsman has daily evidence of this fact in his own experience; for we hold it to be impossible for a man of ordinary powers of observation to pass any considerable time in a wild country, either as a hunter or a traveller, without becoming aware that his eye quickly accustoms itself to instantly catching sight of anything moving in the landscape.

Thus the close presence of game is commonly detected in forest hunting in consequence of the twitching of their ears, the flicking of a tail, or some other little movement of a similar kind. The hunter should endeavour to train his faculties to acquire this gift, and should always be keenly on the look-out for any object in motion.

Mr. Charles St. John, formerly one of our best authorities on sporting matters,* writing some 50 years ago (whose book on Deer Stalking and Natural History in the Scottish Highlands, is still regarded as a standard work on such subjects) even mentions that he has noticed that this constant habit of intently surveying and taking in every detail of the surrounding landscape leaves its permanent impress upon the faces of those who have served a long apprenticeship to the hunter's craft, and that he had remarked that an old hunter can almost be known by his countenance—for, he says—

"a man whose life is spent much in hunting, and in the pursuit of wild animals, acquires unconsciously a peculiar restless and quick expression of eye, appearing to be always in search of something." †

* Obit 1856.

† *Wild Sports and Natural History in the Scottish Highlands*, by Charles St. John. New Edit. of 1880 (originally published 1846).

Those who have been accustomed to seeing and conversing with the white trappers and fur traders of the Far West, in the old "Indian" and "Buffalo days," will probably support these observations of Mr. St. John; as the fact, which has often been noted by ourselves, must be well within the cognizance of many American sportsmen.*

Again few of those who have seen much of the Red Indian tribes, or of their countertype, the Arabs of the desert, can have failed to notice this watchful, restless expression of eye and countenance, which marks the faces nearly of them all. The same has been observed to characterize those of the Indian hillmen and jungle tribes in Hindustan. Some of these faces quite resemble those of a bird of prey. They are eagle-eyed, as it is sometimes said of one of these restless-eyed individuals.

It is sometimes quite wonderful at what distances these people will make out remote objects in the landscape; and how instantly they observe the marks made by game left upon the ground, or detect its presence, lying or standing motionless among thick bush, and wholly invisible to less practised sight.

The sight of natives inhabiting wild countries, is very generally so highly trained in this respect, that Europeans have frequently come to the conclusion that the eyes

* In a well written and interesting account of his travels across the Great Western Prairies in 1839, by Mr. Farnham, we find the following paragraph in reference to this matter:—"The American trappers present a different phase of character. Habitual watchfulness destroys every frivolity of mind and action. They seldom smile: the expression of their countenances is watchful, solemn, and determined. They ride and walk like men whose breasts have been so long exposed to the bullet and the arrow, that fear finds within them no resting place.—They overcome every danger; and perish, as they say, as white men should, fighting bravely"—(*Travels in the Great Western Prairies*, by Thos. J. Farnham, published 1843, Vol. i., p. 293).

of these children of Nature are as a rule, better and stronger than those of civilized man.

Without venturing to express a decided opinion one way or the other, upon this question generally, we conceive it to be quite possible that this extraordinary sharpness of sight is merely the result of lifelong practice in studying and making out the details of a landscape, and is not in any way due to any actual superiority in the optical power of the sight itself. The remarkable keenness of vision exhibited among the American Indians, and the Arab desert tribes, has for instance frequently been commented upon by travellers, and some almost incredible, but still nevertheless possibly true stories have been related about it, which time and space forbids us to notice further at present. In our own country however most of us are aware how very much more quickly a sailor will make out a ship upon the distant horizon at sea, or catch sight of a coast amid mist and fog, than a landsman; yet no one will contend that the sight of naval men generally is better than that of landsmen: the thing is simply a matter of habit and practice. So a novice in the hunter's art will often be within easy sight of, or even close to, game, but by reason of his unpractised senses he fails to see it.

This leads us to the consideration of several curious questions respecting the habits of wild animals and birds.

The facility with which forest game hide themselves from an enemy's view is a truly remarkable peculiarity, common to all forest animals and birds, and indeed more or less so to animated nature, especially among insects, everywhere.

It is perfectly wonderful how difficult it often is to distinguish the outline of even the largest, and one would think the most conspicuous animals, when they are standing motionless, among thick bush, or under the shade of heavy timber. Nature has so wonderfully adapted the colours of birds and animals, to correspond with the prevailing tints of their natural habitats, that even when they are right in front of one, a few yards off, it often takes a practised eye to make them out.

As every hunter is aware, game has the knack of making itself quite invisible in this way, even at very close quarters; and the way wild game will frequently remain perfectly motionless, when danger is near, is a regular habit of theirs which is well known. They are then intently listening to catch the slightest sound of an advancing enemy, and testing the air by their keen sense of smell to detect any taint of his presence carried by the wind. As soon as they have satisfied themselves of the exact quarter from which an attack is impending, if they think they have not been observed, they will endeavour to steal noiselessly away out of danger. But if an animal finds his enemy is very near, so that he cannot escape unseen, he will probably rely upon his skill in hiding, and will very often remain motionless though the hunter may pass within a few yards of him—not infrequently with perfect success.

Thus, in the case of that immense creature the elephant, Gordon Cumming tells us that—

"the ashy colour of his hide corresponds so closely with the general appearance of the grey thorny jungles, which he frequents during the day, that a person unaccustomed to

hunting elephants, might look down upon a herd, and fail to detect their presence"—

and further in the case of the giraffe which is invariably met with among forests where weatherbeaten trunks and stems occur, he says, "I have even known the natives to fail, mistaking these dilapidated trunks for giraffes, and again confusing giraffes with these aged veterans of the forest." *

"As a rule (says Mr. H. A. Bryden, a more recent authority), the giraffe is found in open bushy forest, and when pursued invariably runs for the most thorny and entangling portion. Its own thick hide, and great weight, enables it easily to force a way through the densest obstacles, which tear the horse and rider terribly." "Curious though it may seem, the giraffe is extremely hard to find in a forest country, even though a troop may be feeding with their heads above bushes and low trees, within the vision of the hunter. The long neck has a strange resemblance to the trunks of dead trees, and the colouring of the animal assimilates very wonderfully especially in winter, with the sun-scorched vegetation, the yellow glare around, and the play of light and shade through foliage." †

Next as regards the African buffalo, the largest and finest representative of the race, all experienced hunters unite in saying that the dusky skins of these splendid animals assimilate so wonderfully with the natural tints of the bush, that it is often impossible to see them a few yards away. Professor Drummond also tells us an anecdote about the zebra, an animal which of all others one would naturally think likely to be easily distinguished, on account of the conspicuous pattern

* *Five Years of a Hunter's Life in the Far Interior of South Africa*, by R. Gordon Cumming, 1843 to 1848, published 1850, Vol. i., p. 270.

† *Gun and Camera in South Africa*, by H. A. Bryden, 1893, pp. 329—30.

of his black and white striped skin. But Professor Drummond says,

"Its effect in nature is just the opposite; and at close quarters is as bars of light seen through the branches of shrubs. I have found myself (he says) in the forest, gazing at what I supposed to be a solitary zebra; its presence betrayed by some motion due to my approach, and suddenly realized that I was surrounded by an entire herd, which were all invisible until they moved." *

Sportsmen in Hindustan unanimously speak in similar terms of the difficulty there often is, of making out the striped form of a tiger crouching in the Indian jungle.

From America the same story reaches us, as regards the experiences of sportsmen concerning the great game inhabiting the forests there. Colonel Dodge, U.S.A., speaking of the elk for instance, informs us that—

"For doubling, dodging, and hiding, this huge animal is, considering his bulk, far superior to the hare, or even the fox; and the facility with which he will squat, and conceal himself in the slightest possible cover, is really most remarkable."—"The elk going through timber sticks his nose in the air, and throwing back the points of his huge antlers on each side of his body, makes about as good time as if in the open. When pursued the elk takes instinctively to the very worst ground." †

Animals of the deer tribe, of all kinds, when alarmed, we may state as a rule, generally do this and make for the thickest coverts, or the most inaccessible crags in the mountains—while those of the antelope tribe, on

* *Tropical Africa*, by Professor H. Drummond, F.R.S., 1888. (N.B.—The Professor is here speaking of the open bush forest that covers so much of tropical Africa, and not of the denser forest of the equatorial regions).

† *The Hunting Grounds of the Great West*, by Lt.-Col. R. I. Dodge, U.S.A., 1877.

the contrary, which are dwellers upon the plains, flee from the neigbourhood of cover, seeking their refuge on the most open ground, where they can see the approach of danger from every side.

This habit of making for the heaviest cover, when alarmed, is a regular characteristic of forest game; and is, we believe, practised by them all. The heavy animals, as above described, tear their way by main force through the densest bush, while the smaller ones, some of which have delicate skins, attain the same object by dodging in and out amongst it, or under it, with a quickness and dexterity that is quite extraordinary.

One could understand this among the generally thornless underwood of the forest of the temperate zone; but the matter assumes a very different aspect when one comes to deal with the bush forest of tropical lands in general, but of Africa in particular. In the great game country of the African continent, almost everywhere the bush consists of thorny shrubs and dwarf trees, armed with formidable spines, almost as sharp and strong as needles, which must really be seen to be thoroughly appreciated. Some of these thorns are straight and spear-like, and not uncommonly measure 3 to 4 inches in length. When thoroughly seasoned and dry, such thorns would be capable of piercing through and through the human hand, like a nail, if driven by sufficient force, before breaking. Other thorns are hooked like fish-hooks, and when fixed in clothing will hold a man by main force, unless the cloth gives way and tears into a mass of shreds. Nevertheless the unanimous testimony of African hunters is to the effect, that no thorns,

however strong or sharp, are able to stop the rush of the heavier pachydermatous animals, such as the elephant,* or the buffalo, whose weight and strength enables them to tear through everything. We mention these facts in order that the "gentlemen of England who live at home at ease" may realize some of the difficulties of hunting in the tropical forest.

Now all the very largest quadrupeds, still existing among the fauna of our earth, are *tree-feeders:* that is to say, their food chiefly consists of underwood, or the twigs and foliage of the smaller trees, which according to the high authority of Mr. Darwin, contains much nutriment in a small bulk. African elephants for instance, according to the *Encyclopædia Britannica*, are almost exclusively tree-feeders—especially of mimosas, one of the most thorny kinds of dwarf trees. Hence these heavy quadrupeds may be regarded as being strictly speaking beasts of the forest, and visitors only to the plains country, to which their excursions are made mostly by night; daybreak, or soon afterwards, finding them once more beneath the shadow of the trees, which Nature has evidently intended as their more permanent home.

No species of heavy game animals answers more closely to these conditions than the buffalo (*Bos Caffir*) which range over an immense area of the African continent.

As these splendid animals never go far from cover, unless under the compulsion of failure of water or food, they may be classed among the regular habitants

* According to Mr. Darwin the average weight of a full-grown elephant is about 5 tons. One killed at Exeter Change was partly weighed and was estimated at 5½ tons. See *A Naturalist's Voyage in H.M.S. Beagle*, by Chas. Darwin, 14th Edit., 1879, p. 87.

of the forest. They may at times in the course of their migrations be obliged to cross considerable sections of open country, but this is only done under stress of circumstances, and their abiding place is on the edge of great forests, where they can go out to feed upon the open grassy grounds by night, returning to the forest with the early dawn; and in no species of hunting is it more necessary, as a general rule, to be up early, than in buffalo hunting; as it is almost useless to attempt to follow them through thick bush by day—as they are always hidden in the densest cover, where they are quite invisible. The way in which bands of them will slip away without being heard is also often most remarkable—their traces, left upon the place where they have been resting, may indicate that they have only just vacated it; still very often no sound of crackling twigs and branches will reach the hunter's ear—the game has stolen away, silently pushing through thorny bush though it may be almost impenetrable to man, without creating a noise audible even at a comparatively short distance.

When however, they do not detect the hunter's presence till he is close upon them they will then frequently go crashing through the bushes with the headlong fury of mad bulls; or if a single animal be suddenly come upon, he will probably charge the intruder with desperate resolution, and even hunt the huntsman, as a terrier does a rat. From these and other circumstances, which we shall speak of more fully presently, buffalo hunting may be regarded as the most dangerous of all jungle sports, that is to say, by far a greater number of fatal accidents have resulted from charging buffalo, than from the assaults of any other

description of wild animal. This is so clearly shown by the unanimous testimony of so many hunters of authority, that we conceive it to be unnecessary to do more than state the mere fact that it is so. From Africa, from India, and indeed from every country where wild buffalo exist, this is the conclusion arrived at by nearly every sportsman of experience.

A wounded buffalo is an adept at hiding, and will lie in wait in thick bush for the unwary hunter, as a cat does for a mouse; if on the other hand he desires to escape, the clever and noiseless way in which these great animals will effect their retreat is often astonishing.—Under such circumstances not only the buffalo, but all the heaviest game will often noiselessly vanish from sight, as if they had actually disappeared into the ground.

Thus Mr. Selous, in his book on African hunting, has related a very characteristic incident of this kind, where a large bull elephant suddenly disappeared from close beside him in this remarkable manner.

"A short distance from the edge (he says) the jungle became exceedingly dense and about 20 feet high. I was creeping forward step by step, when one of my bushmen touched me gently on the arm—and following the direction of his hand and eyes, I beheld the dim outline of an elephant towering through the dense sombre-coloured leafless bush. After I had once seen him, it was easy enough to make him out, for he was not over 15 yards from me." Just then some shots fired by other members of the party startled him, and Mr. Selous states—"Before I could raise the gun to my shoulder, the huge beast wheeled round, and was off—a hare could not have turned and got under way more expeditiously, or more silently." *

* *A Hunter's Wanderings in Africa, Five Years amongst the Game of the Far Interior*, by Fredk. C. Selous, 1881, p. 104.

To persons unacquainted with forest hunting, it might seem almost incredible that such a huge beast as an elephant could be so hard to see, or could possibly move off so noiselessly through thick bush, but the thing has been too often recorded to admit of a doubt. The late Sir Samuel Baker for instance, when hunting in his younger days in the Ceylon jungles, mentions coming upon a herd of elephants in a similar way.

"We were (he says) within six paces of them, concealed behind the trunks of large trees, from which we could discover the dim forms of six elephants, through the screen of thorns, which had a similar effect to that produced by looking through a gauze veil. For some moments they stood in an attitude of intense attention, and I momentarily expected them to break cover, as we were perfectly still and motionless. Suddenly they winded us, and whisked round to the thick jungle, disappearing like magic." *

The difficulty of making out the form of an animal, even of the largest size, and of the most apparently remarkably visible pattern of hide, owing to what is known as the law of "protective colourings," is an undoubted fact, which has been already discussed; and this "veil of thorns" spoken of by Sir Samuel Baker furnishes an exact picture of the effect created by the intervention of a thick hedge of twigs and branches. Moreover the soft and spongy nature of the elephant's foot to a great extent explains how it comes to pass that these mighty beasts can tread with so noiseless a footfall.

Those, for instance, who have witnessed the stately

* *The Rifle and Hound in Ceylon*, by Sir Samuel W. Baker, New Edit. of 1882, p. 243 (originally published 1854).

processions of tame elephants in India, must have noticed how absolutely noiseless are their footsteps, on the hard and sun-dried plain. The same thing is noticeable even in a greater degree, if possible, as regards the camel's tread, which on almost all kinds of ground rarely produces a sound.

Mr. Gordon Cumming, the African hunter, gives a most striking example of the silent way in which a whole herd of elephants came up to a bush forest water-hole, where the great hunter was watching by night for the arrival of game.

"I had lain," he says, "about two hours—presently they (the elephants) walked up to the water, and commenced drinking within 50 yards of me.—They approached with so quiet a step that I fancied it was the footsteps of jackals which I heard; and I was not aware of their presence until I heard the water which they had drawn up with their trunks, dropping into the fountain.—I then peered from my screen, with a beating heart, and beheld two enormous bull elephants which looked like two great castles, standing before me." *

The splendid scenes of wild animal life, which from a hunter's point of view were to be witnessed within the memory of living sportsmen, in many parts of the world, on these and similar occasions, have been more fully described in our chapter on "Great Herds of Game;" we must however make room for a sketch of another of these spectacles occurring at a forest drinking pool in Ceylon, about the year 1847, left us by the pen of that ready writer and accomplished hunter the late Sir Samuel Baker.

This pool, situated not far from the ancient ruined

* *Five Years of a Hunter's Life in the Far Interior of South Africa*, by Roualeyn Gordon Cumming, of Altyre, 2nd Edit., 1850, Vol. i, pp. 308—9.

city of Mahagam, was the only one known to exist for miles round; and by the advice of the natives Sir S. Baker decided to watch beside it, at the usual drinking hour of the game.

"It was," he informs us, "a small round sheet of water, perhaps 80 yards in diameter, which lay in the midst of a dense jungle.—Several large trees were growing close to the edge, and around these lay numerous rocks of about 4 feet high, forming a capital place for concealment. Covering the tops of the rocks with boughs to conceal our heads, we lay quietly behind them, in expectation of the approaching game. The sun sank, and the moon rose in great beauty, throwing a silvery light upon the surface of the water, chequered by the darkness of the surrounding trees. Suddenly the hoarse bark of an elk (sambur) sounded within a short distance, and I could distinguish two or three dark forms on the opposite bank. The shrill and continued barking of spotted deer, now approaching nearer and nearer; the rustling in the jungle and the splashing in the water, announced continued arrivals of game at the lonely drinking-place. Notwithstanding the immense number of animals that were congregated together, we could not distinguish them plainly on account of the dark background of jungle. Elk, deer, buffaloes and hogs were all bathing and drinking in immense numbers, but there were no elephants. For some hours we watched the accumulation of game; there was not a breath of air, although the scud was flying fast above us, occasionally throwing a veil over the moon, and casting a sudden obscurity on the dim scene before us. Our gun-bearers crouched around us, and their dark skins matching with the ground on which they squatted, they looked like so many stumps of trees. We had just finished (supper) when our look-out man whispered in my ear the magic word 'alia' (elephant) at the same time pointing in the direction of the tank." *

* *The Rifle and Hound in Ceylon*, by Sir S. W. Baker, Edit. 1882, pp. 158—159 (originally published 1854).

(Three were seen and two killed). In this district of country, in Sir S. Baker's time, game of all sorts was extraordinarily numerous, especially buffalo, which roamed in large herds over some adjacent plains. We have quoted the incident because it is very rare to find game so numerous in dense jungle tracts, or to find a forest pool so situated as to render night shooting practicable, as in this instance. The explanation of the concourse of game is furnished by the scarcity of water, which obliged them to congregate where it was to be found, in the way described by Sir S. Baker.

In the great American forests of the temperate zone, where water is plentiful, as we have said, such numerous collections of game are exceedingly rare, but in common with those of the tropical jungles their large game animals are all endowed with a similar stealthy nature of movement which enables then to slip away through the thickest undergrowth, almost without creating a sound. The moose and the wapiti (or elk) for instance, are adepts at it, and so use their great horns like a species of armour as to brush aside the branches without creating any audible sound of crashing through the bushes, which seem to be gently swept out of the way, and then to close up again in the rear of the passing animal, in the most perfect and adroit manner conceivable. It is only when one of these beasts is come upon suddenly, and thus becomes panic-stricken, that it dashes off furiously through everything, in a panic; but in general as we have said they make little or no sound in their flight. Bears in the same way roll off, and disappear through the underwood, almost before one can catch sight of them. Thus Mr. Phillips Wolley relates the following incident, which

came under his notice in British Columbia, with reference to the grizzly bear, the largest and heaviest of the genus "Ursus"—

"Suddenly (he says) a brown mass was seen not ten paces in front of us. Silently it rose upright, making, as far as I could hear, no sound at all, and as suddenly before I had time to fire, gave one quick lurch, and was gone into the bush, as quickly and as silently as if he had been only a British bunny, and all that was left of him was a little column of yellow dust.

"Except for the noises we made, and the chattering of some squirrels" (says the same author) "intense silence reigned in the woods. There are no birds, no life anywhere—whatever is in the forest (and you can't help feeling that it is full of live beasts), is endowed with ghostlike silence of tread, and the power of remaining invisible." *

Similar remarks were made by Lord Milton and Dr. Cheadle in their interesting work on The North West Passage by Land, made by them in 1862—64; their experience of the great forests of British Columbia being that "animal life was scarce, and the solemn stillness unbroken by note of bird, or sound of living creature."—Such are invariably the impressions first created upon the minds of sportsmen by a hunting tour in these tremendous expanses of gigantic timber, which still extend over a vast area in North Western America with but few intervals of open country, until the mountain region is reached. Here, spacious tracts of open country generally extend above the regular limits of tree growth, where the game has to be regularly stalked under the usual conditions of mountain shooting. These barren grounds are mostly situated

* *A Sportsman's Eden*, by C. Phillips Wolley.

at considerable elevations upon the higher slopes of the hills; and certain special varieties of game are to be met with upon them, which rarely or never, except perhaps in the heaviest snows, descend into the timbered country. In the hot season however during summer, when flies are troublesome, a great deal of the forest game is driven up into these hills, and excellent sport may still be found in such localities, but it is only to be had at the cost of hard walking, over exceedingly rough ground.

Before drawing this section of our work to a close we must briefly summarize what we believe will generally be found the best course for a sportsman to follow, in seeking for game in the forest, subject of course (as all suggestions of this nature must be) to such necessary variations as the local conditions of climate and country may render imperative.

The first and perhaps the most important of these, from a hunter's point of view, is the occurrence of a spell of stormy weather.

During high winds, which are generally admitted to be bad for stalking on the plains, it is usually considered for several reasons the very best time for forest shooting.

In the first place, during very calm still weather, every little noise we have already explained is heard, whereas in stormy boisterous weather, when the trees are creaking, and bushes rustling, game cannot so easily distinguish the sounds made by persons passing through thickets, or treading on rotten sticks. The practised hunter therefore always takes care to avail himself of these advantages as far as he can, and in

windy, gusty weather, where he has the option he leaves the open country and takes to the woods.—On such occasions whenever there is a lull in the wind he ought to stop, so that his footsteps may not be heard, immediately pushing on again during the heavy gusts, whose sighing among the trees will effectually cover any sound of his movements. This gives time to examine all the surroundings, for a hunter in the forest must as we have said before always be on the alert, as he may come upon game at any moment.

Forest animals are however generally very watchful and restless at these times, as if aware of the disadvantage they then lie under in detecting the advance of enemies, and when suddenly come upon are apt to jump up in a panic, and go off crashing through the underwood before the hunter can get a shot at all, or after getting at the most the chance of a snap-shot before they disappear among the trees. If they are lying concealed in heavy cover however they will generally lie perfectly still, so as often to escape notice altogether. Many sportsmen prefer shot guns loaded with ball for use under such circumstances, instead of a rifle, as among thickets they often get snap-shots, within a few paces distance, when it is a question whether a shot gun is not even more effective than a rifle. This however is of course a matter of taste and opinion—and personally we prefer to adhere to the superior weapon, the rifle, at all times.

The foregoing remarks however, must be held to apply mainly to regions situated in the temperate zones. In the tropics, in the hot weather, game generally seek the deepest shade in the heaviest cover, and remain quiet during the daytime, coming forth on

the approach of darkness to feed and go to water—and storms are mostly confined to the period of the rains, when malaria is prevalent in severe type.

In the next place, as regards the best hunting ground, the young sportsman will not fail to remember that throughout all great forests, there are always to be found swamps where, on account of the nature of the ground, heavy timber will not grow, or has fallen. These places are generally filled with an almost impassable thicket of shrubs and brushwood, and are therefore usually selected by deer, and other sorts of woodland game, as their harbouring places during the daytime.

There are also sure to exist some more or less extensive areas of ground, where masses of timber have been blown down during hurricanes. These places often present a most extraordinary scene of confusion; the trees lying across each other piled up to a considerable height—while among the fallen timber a young growth of trees springs up, forming a tangled mass of dead and living vegetation, through which it is next to impossible to pass.

Naturally such places are selected by game as their securest sheltering place, and either there, or else in the swamps, the greater portion of the forest creatures are hidden, out of the reach of enemies. It would of course be useless to attempt to follow game into these thickets.

The hunter should however creep noiselessly to leeward of these places, and take his stand in some well-selected position, where there is a comparatively open space or where several well-beaten game paths pass, having previously arranged for someone with a

dog if possible to go round to the other side of the swamp, or blow down, and drive the game that may be in it towards him. The deer, or whatever other animals may happen to be lying within, will immediately be alarmed by the noise and by the scent of the beater, and the hunter will have a good chance of getting a shot at them as they break away.

Also along the outskirts of forests there are usually detached covers or belts of timber, standing out as promontories; these can be driven in the same way, or hunted by a dog, whilst the hunter takes up a position commanding the pass into the main forest, and if one of these places contains game, he is thus pretty sure of getting a shot.

Most animals of the deer tribe, when seen making off through the woods, can be brought to a stand by the hunter giving a shrill whistle or hallooing sharply, and the deer fearing he may be running into danger will generally stop short for an instant, and then if the hunter is quick enough he can generally get a standing shot. Of course he should be careful to so time his shout, that the deer may come to a halt while passing an open space, where an advantageous shot can be taken.

Special care should be taken to hunt carefully over all places where points of the forest run out into lakes, or into bends of great rivers; by going from one of these places to another, an expert hunter can generally kill deer, if they are moderately numerous in the vicinity.

Another good place for obtaining game, is where there are saline springs or incrustations of salt, caused by the drying up of brackish water. Such places are to be found in most parts of the world. In North Ame-

rica they commonly go under the name of "salt licks." Timber generally will not grow in these places, which are much frequented by deer and other animals, and anyone who knows the locality of such spots can generally obtain game by watching them during moonlight nights, or in the early mornings and evenings. Sometimes settlers in the backwoods of America can bring deer to a place by making an artificial "salt lick," by cutting down a pine in winter and placing a block of rock salt beneath it, in localities where deer are known to abound, which are then pretty sure to come and browze on the pine tops, and lick the salt.

In dry countries where water is scarce, and the pools divided from each other by considerable distances, the watching of these lonely desert pools is sometimes the only feasible plan of getting shots at wild and wary beasts, as they go down to water. There are many tracts of practically waterless forest in the dry regions of the earth; it is therefore needless to remind the reader that it would be quite useless to attempt this sort of sport, unless under the guidance of trusty natives, who know the whole country intimately. The hunter would be more likely to leave his own bones in these thirst-lands, than to enjoy sport, if he was to unwisely trust himself into such places alone.

There remains the system of driving ravines and tracts of dry jungle with beaters. Our Indian sporting records are full of descriptions of splendid sport which may frequently be obtained in this way; and the best time for it is generally during the very hottest part of the year, when the vegetation on the plains is entirely desiccated and the game driven into these coverts by the fiery blasts of hot wind, and intense solar heats.

But of course this species of shooting necessitates the employment of a small army of beaters, and becomes impracticable where the services of such assistants are not obtainable. Sometimes, in Africa, we have been lucky enough to obtain good sport of this kind, by utilizing the services of Arab villagers, after securing the good offices of the local Sheik.

The jungle is so very dense in some of these localities, and of so thorny a nature, that it is difficult to find a suitable stand where the expectant sportsman can obtain a space clear enough for shooting. Under such circumstances, the only alternative may be to climb into a tree, and take one's chance from there, at some point where a view can be had of some one or more well-beaten game paths, along which the game will very often endeavour to steal away when they hear the noise of beaters.

Another device is to watch the cultivated lands near the margins of the forest by night when they are subject to predatory visits from the forest game animals; this is however a matter more properly dealt with in our next chapter.

We may however just remind the reader, that as such places are in general only raided by wild animals under the cover of darkness, little sport is therefore to be expected during brilliant moonlight. The native farmers can however generally tell the usual directions of exit of these creatures from the forest, and the most common time of night when their depredations are made; and guided by them, sport may often be obtained which could not otherwise be had. It is mostly their practice to wait till all is quiet, so that it is generally some considerable time after the closing in

of night before the wild beasts issue from their lairs; and they are gone again to their inaccessible haunts in the thickets, long before the faintest tinge of dawn comes to awaken the busy world of Nature from its nocturnal slumber.

In such districts the habits of the forest game become almost purely nocturnal, and very little is to be done by day, except as we have observed, when a sportsman is in a position to command the services of beaters.

The records of antiquity show that the habits of wild beasts have in this respect remained unchanged throughout historic time: as a sketch of just such another nightly drama of the forest, handed down to us in the Psalms of David, very clearly proves; wherein the words of Scripture run as follows—

"He appointed the moon for seasons:
The Sun knoweth his going down.
Thou makest it darkness, and it is night:
Wherein all the beasts of the forest do creep forth.
The young lions roar after their prey,
And seak their meat from God.
The sun ariseth: they gather themselves together,
And lay them down in their dens." *

Nothing is more striking in the economy of Nature than this uniformly strict conservatism, like "the law of the Medes and Persians which altereth not," but glides on smoothly throughout the ages, changeless and unchanged—and we may just remark while glancing at these facts, that the cry every now and again

* *Psalm* civ, verses 19 to 22 (written *about* B.C. 1050).

raised among certain sections of the human race, for a lawless liberty, equality, and fraternity, finds no support in the political economy of Nature. "Earth" (says Winwood Reade) "should be a reflexion of Heaven—and Heaven is an Empire." *

Everything is made strictly subservient to rule, and to subordination; and no two things are ever created alike, or equal: on the contrary some things are created beautiful, others repulsive and ugly.—Some forms of animated Nature are created strong, and others weak and timid; and the law of force appears to govern throughout the whole range of the animal, and even the vegetable kingdom. Every form of life is found engaged in waging a continual warfare with everything around it, wherein the iron necessities arising out of the fierce struggle for existence render each class pitiless in its dealings with the rest; and so the weak go down before the strong, and life flourishes upon the destruction of other forms of living creatures. Judging from these precedents therefore, the advent of an era of universal peace seems to be indeed remote.

These things being so, show that "the hunting instinct" has descended among the whole animal creation, as part and parcel of their nature, and in this the *genus homo* is necessarily included. This makes good our contention respecting the "sporting tastes" in human nature, which are therefore by no means to be lightly decried on the grounds of being demoralizing and unnatural; for in fact, man was created a hunting animal, and still is, and will always continue to be one of the beasts of prey: however much doctrinaires may desire

* *Savage Africa*, by W. Winwood Reade, 1863, p. 31.

to gloss over the fact, he is the most destructive of all such creatures. See how whole races of valuable, beautiful, and harmless birds and animals have been exterminated by him!

Returning however to the consideration of the subject of forest hunting—we must give a short account of its practice in winter, and especially in snow-time. In the forests of the temperate zone a great deal of the vegetation is of a deciduous nature, and until the fall of the leaf the cover is often so dense that hunting is conducted under many difficulties; moreover it is during this season that the young of both birds and beasts are being reared, so that most of the game is regarded as out of season. Nature therefore seems to indicate the autumn and winter months as the most seasonable time for the human hunter to follow his favourite sport.

"Many of the best still-hunters" (says Mr. Van Dyke) "will not hunt at all until snow comes, and in the Eastern or North Western States (of America) the season may be said to commence only 'when snow flies,' as they say in the woods." * And from the delightfully clear beautiful weather that often comes on after and between the snow falls, and the complete absence of those terrible insect pests which in many places render life in the woods a martyrdom during the summer season, there can be no doubt that, taken all in all, the winter hunt is the pleasantest of the whole year.

It might be supposed that the cold would prove unendurable and dangerous to health; but experience shows that in general the very reverse is the case,

* *The Still-Hunter*, by Theodore S. Van Dyke, 1888, p. 122.

and with good fur rugs, to use at night, no one need fear the coldest weather.

The atmosphere at these times is so exceedingly dry and still, that the cold is not felt so much as it is in damp climates, where the air is generally saturated with moisture; and as we have pointed out in our arctic section, the therapeutic effects of dry cold are often highly beneficial to people with delicate chests; also the death-rate of Europeans serving in the arctic regions exposed to all the intensity of the polar cold, has been proved to be actually lower than in any other part of the world. Nevertheless we do not of course presume to suggest that it would be prudent for persons in delicate health, as a rule, to trust themselves far out in the woods, away from shelter and medical assistance, although notable cases have come under our own observation, where sickly and delicate men have dated the commencement of their recovery to sound health from the time when they first breathed the fresh air and balsamic pine incense of the great forests of North Western America. If however the weather should turn from dry cold, to rain and cold stormy winds, as it occasionally does, a man who is not in fair health would hardly be warranted in exposing himself to the discomfort and hardship which such an eventuality would entail, should he be overtaken by it, in regions beyond the shelter of human habitations. Still it is common for men to pass months encamped in the woods, and on the plains, exposed to all the vicissitudes of weather and climate, without ever catching cold or having a day's illness. In fact we have done this ourselves, and strange to say our first return to civilization and to a comfortable hotel, was marked by the onset of a

severe cold. These are strange and apparently inexplicable facts, but it is within our own personal knowledge that Indians will very often object to enter a white man's dwelling house, and prefer to accept proffered food etc., in the open air outside, because as they say, "going into the houses of the pale-faces gives them colds"—and we have so often heard the same story repeated among the trappers and Hudson Bay Co's men, in the west, that we can have no doubt of its practical truth, and that it is not the result of Indian fancy or caprice. The true explanation of the enigma is that it is the going out of close rooms into the open air, that causes chills and colds. It is moreover an ascertained fact that since the Indians have taken to wearing clothes, have erected huts, and adopted white men's ways, they have become afflicted with lung disease in a way that was totally unknown under the old regime of paint and feathers. Whole tribes have perished by it in Labrador and elsewhere.

In the New World the close of summer is very often marked by the sequence of the pleasantest weather of the year. Very beautiful is the fall season in the American woods, and indeed in all countries where the winters are severe; in England we can form no conception of the brilliant autumn colouring of the foliage, assumed by the deciduous trees in these countries at such times.

Perhaps we shall be pardoned if we venture to quote some verses on the subject from the pen of an American, leaving our readers to judge for themselves whether they are appropriate for introduction here or not. As for their accuracy of description, that we find no hesitation in vouching for.

"It is brilliant autumn time, the most brilliant time of all,
When the gorgeous woods are gleaming, ere the leaves begin to fall,
When the maple boughs are crimson, and the hickory shines like gold,
When the noons are sultry hot, and the nights are frosty cold.

When the country has no green, but the sword grass by the rill,
And the willows in the valley, and the pine upon the hill,
When the pippin leaves the bough, and the sumach's fruit is red,
And the quail is piping loud, from the buckwheat where he fed.

When the sky is blue as steel, and the river clear as glass;
When the mist is on the mountain, and the network on the grass.
When the harvests all are housed, and the farmer's work is done,
And the woodland is resounding with the spaniels and the gun." *

"It would be hard (says an American sporting author) for a man to spend a holiday more pleasantly, and beneficially, than in the Canadian woods. Hunting leads him into beautiful scenery: his method of life induces contemplation of Nature, and tends to wholesome thoughts.—He can read out of the great book of Nature, and find books in running brooks, sermons in stones, and good in everything." †

"I think no lover of Nature (says another high American authority on such matters) can be an unkindly—or, at the bottom, an evil-minded, or bad man." §

* *Autumn*, or *The Fall, in the United States*, by W. Cullen Bryant.

† *Sport with Rod and Gun in American Woods and Waters*, by Alfred M. Meyer, 1884, Vol. i., p. 205.

§ *Frank Forrester's Field Sports of the United States and British North America*, New York 1882, Vol. i., p. 264.

American opinion will be found practically unanimous, among experienced sportsmen, as to the moral value of the training conferred by a short sojourn in the woods, and few who have given the thing a trial will ever look back upon their trip with other feelings than those of pleasure. Even when the weather turns out unfavourably, and is wet and rainy, so far as the prospects of sport go the discomfort is not without its counterbalancing advantages—for rain has the effect of softening down the fallen leaves so that they do not rustle under the feet, and dry twigs become pliable, and do not snap noisily as in dry weather; moreover the pattering of the rain of itself helps to prevent the hunter's movements being heard, so that rainy weather, though unpleasant, is good for still-hunting in temperate climates, where malaria is not to be dreaded. The tropical rains however are so tremendous, and the springing up of rank vegetation so exceedingly rapid, that after the first day or two of the rains (at which time game often show themselves in considerable numbers on the edges of the open grounds) sporting in general has to be suspended until a more favourable time.

Getting wet in tropical Africa, and indeed in most malarious districts, for instance, is almost the certain prelude to an attack of fever:

"During the summer rains in India," says Sir Richard Temple, "the animals roam so far afield, and so constantly shift their abodes; the woods and forests become so thick, the trees so impervious, and the mist and downpour so depressing, that the hunter must rest in enforced idleness. In Autumn the malarious exhalations warn the most hardy and adventurous to beware of entering forests, where in

a single night a life-long malady may be contracted." *

In the great forests of British North America and the United States however, these serious drawbacks have no existence. It is true that at the time of the early settlements, fever and ague were very common and fatal among the European settlers; this however was brought on by the neighbourhood of swamps and flooded lands, and the turning over of the virgin soil, an operation which experience shows is in all new countries attended with risk to health."

But under modern conditions, and since the general practice of wearing woollen garments has been introduced, ague is much more seldom met with, and need not be dreaded during a hunting trip in the forests of the northern States and Canada, during the autumn and winter months, at all events.

One of the curiosities of sport in Canada is that known as "moose calling," which is practised during the still moonlit nights of autumn. Full descriptions of it will be found in most American sporting works. The caller, who is almost always an Indian, uses a conical tube of birchbark as a trumpet, with which he imitates the cry of the cow moose with wonderful success, and many fine bulls are shot by this stratagem, even by indifferent sportsmen, for the shooter has only to sit still, and follow the Indian's directions, till he gets his shot.

Another speciality of the Canadian woods is moose hunting in deep snow, when the animals are "yarded" in spaces where they have trodden down the snow into a hard floor, and out of which they rarely move

* *India in* 1880, by Sir R. Temple, Lieut.-Governor of Bombay, p. 348.

till the snows melt, but maintain themselves by browsing on the trees enclosed in their yard, which sometimes contains 10 to 20 acres of ground.

Indians are sent out to discover the locality of these moose yards, and on their bringing in this information to the settlements, parties are made up to go on snow shoes and shoot the moose. This furnishes the sportsman with a good walk and the novel experience of a snow camp in the forest, and many fine animals are thus killed—but they have shed their horns during autumn, so that even the finest head thus obtained is destitute of its principal ornament. In New Brunswick and Nova Scotia, where moose were formerly immensely numerous, professional skin-hunters have however nearly killed them all off, by slaughtering these noble animals in their yards in this way for the sake of their hides. A time is chosen when the frozen crust upon the snow is strong enough to bear a man, but breaks through at once under the greater weight and smaller foot of this great deer, who floundering helplessly in the deep snows is easily overtaken and killed, by men skimming along the frozen surface on snow shoes. Many thousands were slaughtered in this way, as the skins were valuable, and it is said produced £1 each in the raw state.

There is probably no time when the glorious pine forests of America are to be seen in all their stately magnificence, to better advantage than during winter, when heavy snows have recently fallen, and the atmosphere is perfectly still, dry, and clear; at such a moment the woods present an almost ideal scene of unsurpassable grandeur and beauty, the whole landscape being thickly buried under a canopy of freshly fallen

snow, which bends all the branches downwards with its weight, and drapes each pine spray in a mantle of dazzling white. On these occasions the snow always naturally arranges itself in the most artistic draperies, representing the softest foldings and most delicate traceries, and often presents the appearance of flocculent masses of cotton wool, or lovely groupings formed of clusters of white ostrich feathers, pendant from the terminal shoots of the branches. To see a fairylike panorama of this sort to the best advantage, it is necessary, as we have already observed, that the atmosphere should be perfectly still; a breath of wind, or even the echo of the human voice, or the passage of persons through the bush near by, is sufficient to cause masses of this feathery snow to fall, and so to a certain extent to mar the exceeding beauty of its effect: for it must be remembered that all this snow is a delicate powder, light as swan's down, and dry and fine as flour, that brushes off clothes like dust without wetting them in the least, and when the snow is in good condition it is possible to wade all day through it, when it is not too deep, without the feet or clothing becoming damp.

Indeed should anything occur to dampen the clothing it would be attended with considerable risk of frost bite, for the air is intensely penetrating and keen as a razor; the cold however is not severely felt by day on account of the exceedingly dry and still condition of the atmosphere. At night, strange as it may seem, a very comfortable camp can be made, with the sky only for a canopy, by clearing a space for it in the snow, which is generally shovelled out with a snow shoe, and so arranged as to form a protecting bank

to windward. A roaring fire of pine logs is then set going and the party sleep around it, wrapped in furs, without suffering in any way.

When a stormy wind accompanies the snow however the circumstances become very different to those which we have just sketched. These icy gales are sometimes of the most serious and dangerous nature, and are commonly known under the name of blizzards, remarkable instances of which have been already recorded in our chapter on "Climates and Temperatures." The searching nature of the cold is then very intense, and the whole atmosphere becomes so full of driving snow dust that it is impossible to see a yard in any direction, while the snow-wreaths quickly form into banks or drifts, which fill every hollow spot in a few minutes to depths which would take a man overhead. These drifts also form at unexpected spots wherever eddies of wind occur, forming such barriers across roadways and railways, as to completely paralyze traffic throughout the country, for the time being.

In Canada, and other severe northern climates, travelling at such times becomes exceedingly dangerous, and many unfortunate persons thus get lost every winter. When overtaken by one of these storms they are unable to see their way, and wander off the path into the driving snow, and so become engulfed in drifts and frozen to death. Large numbers of sheep and other stock are annually lost in a similar way, but instances have been known of animals buried in snow drifts surviving and escaping after long imprisonments, as enough air penetrates through snow to admit of breathing freely.

After a moderate snow-fall, when it is not too deep to interfere with travelling, of course the trail of

every bird and animal that moves through the forest is plainly visible in the freshly fallen snow, and can then be easily followed by every person of ordinary intelligence. Excellent sport may now be had by the hardy hunter, by using certain well-known and necessary precautions: as for instance when the trail runs down wind the sportsman would of course be scented by the game, if he followed directly upon the track; this obliges him to make a number of loops to the leeward side, which cut in upon the trail at detached points, like the letter "B" (the straight part of this letter representing the trail).

This plan is almost always adopted by Indians when running the trail of wild and wary game, like elk or moose, in order to defeat the well-known stratagem to which we have already drawn attention, employed by these animals in guarding the back track of their own trail from pursuers; which is done by circling off to leeward, going back some distance in the direction of the trail, and lying down a short distance from it, down the wind; then if an enemy attempts to follow on the tracks, he is instantly detected by the great deer's sharp nose. The animal thus obtains ample time to slip noiselessly away before his pursuers become aware of his presence.

One great advantage which a recent fall of snow gives the hunter also is that it serves to muffle the sound of his footsteps; it also enables him to see an animal much more easily than upon bare ground, the white glare upon the snow having the effect of causing all birds and beast to look black by contrast with it, so that they are visible a long way off; and doubtless it would give a similar advantage to game, as regards the

man, were it not that the latter can adapt the colour of his clothing to meet the change of circumstances. An entirely white costume has however, as we have already pointed out, the objection that it becomes very visible if dark tree trunks form the background. The hunter must therefore use his judgment accordingly.

Admirable advantage, when the cold is severe, can often be taken at such times of frozen pools, lakes, and other water courses, whose hard and level surfaces can frequently be utilized as paths by the hunter to make his way noiselessly from point to point, as occasion may require. These frozen surfaces are also frequently utilized by cariboo and many other kinds of forest game for the same purpose, and should moving specks be seen approaching in the distance, shots may often be got at the passing game by hiding among reeds or bushes that form an edging to such waters.

We ought to mention before closing the subject of snow hunting, that when snow has lain some considerable time, so as to become consolidated by moisture or partial thaws, it makes a "packing sound" under foot, which is very unfavourable for hunting—especially so, if an icy film has subsequently formed upon its surface; as this crust breaks down at every step with a crashing sound, that renders footsteps audible at a very great distance in the intense stillness that always prevails in a great forest during snow-time, when the faintest sound generally re-echoes with startling distinctness; so much so that we have heard the taps of a woodpecker upon a tree trunk, assume all the characteristics of a distant wood-chopping done by human hands with a hatchet. It is sometimes difficult to locate, all at once, the exact position of faint

sounds heard in the forest, when this deathlike stillness prevails, so as to determine whether they are loud noises afar off, or small noises near by, and it is only by attentively listening for their repetition that one can distinguish their origin. Such sounds heard at night often assume a most weirdlike unearthly character; some of them of course may proceed from the cries of birds and beasts which inhabit the forest; but they are frequently caused by the falling of a rotten branch, the fall of snow from trees, the creaking of twisted boughs in the wind, the formation of cracks or fissures in the ice upon the surface of water, or even explosions within the trees themselves, caused by the freezing of the sap; these latter frequently represent pistol shots, and a combination of all these noises often sounds like the stealthy passage of wild beasts or human beings, rustling among the adjacent bushes. They are however in the great majority of cases, caused by some one or more of such-like natural causes, and the traveller may generally sleep safely at his ease, as the light of his camp fire is seldom visible more than a very short way off, through the bushes, and darkness puts a stopper upon the movements of human intruders, except during the very brightest moonlight. We have however often heard newly arrived settlers, and others, speak of such matters, and complain how greatly they were disturbed by them: we therefore take occasion to make a brief reference to them here.

In Russia and other countries where much snow falls, the winter is the most favourable season of the whole year for many kinds of work, such as drawing heavy loads, like timber, etc., through the forest by means of sledges; where there are no railways this is

therefore the time for bringing up supplies of different kinds, for military operations intended to be put into practice upon the opening of spring. In the American forests also, it is the time for the lumberer's work, and timber cutting proceeds apace. For the hunter too, the sledge and fallen snow afford a ready means of dragging home a deer to camp or to the settler's log hut, as heavy loads glide easily along its soft surface. Meat and provisions of all kind will also keep as long as the cold weather lasts. In the Russian markets for instance, travellers' accounts show that it is a common practice to stack the bodies of pigs, sheep, and quarters of beef, much like firewood, as there is no chance of its spoiling until the frost breaks up. We mention these matters here in order to bring into notice certain advantages, by no means to be despised, in those countries where long and severe winters, with heavy frosts and snows, are of annual occurrence.

CHAPTER XVI.

HUNTING AND STALKING ON PLAINS.

The Great Plains Regions. Fundamental Differences between Forest and Plains Hunting. Distant Objects seen on Great Plains. The Red Indian "Sign Language." Red Indian Prairie Guides and Scouts. Keen Sight of Native Dwellers on Plains. Field Glasses as Aids to Vision. Binoculars as Night Glasses. Searching for Game with Glasses. Peculiarities of the Plains Atmosphere. Its Effect on Rifle Shooting. Judging Distances in Plains. Across Water. Mirage. Preternaturally Clear Air. Optical Illusions. Effects of Dust Clouds. Tropical Haze. Effects of these Phenomena on Shooting. Value of Practice with Pea Rifles. Morris Tubes. Target Practice. British Soldiers and Boers at the Targets. Target Practice will not of itself make a Good Game Shot. The First Approach to a Great Game Country. Travelling and Hunting on the March. Running Game with Horses. Loading and Firing from Horseback. The Prairie Indians and the Chase of the Buffalo. The Old Indian Bow and Arrow as a Sporting Weapon. An Indian "Buffalo Surround." George Catlin on the "Great Fall Hunts." Indian Trade Guns and Gun Accidents. Serious Nature of Falls from Horses Running Buffalo. The Number of Horses Required by one Hunter for a Season's "Running Game" in South Africa. Salted Horses and the African Horse Sickness. The Running and the Stalking System. Mr. Gordon Cumming's Opinion. Uncertainty of Shots fired from Galloping Horses. Game and the Sound of Firearms. Riding up to Large Herds of Game. Horses Standing Fire. Securing Restive Horses. Value of Steadiness in Remounting. Blindfolding Restive Horses. Horses Running Off after a Fall. Grass-fed and Corn-fed Horses. Unshod Horses for Travellers' Use. Horses on the March. Docility of Horses in a Wild Country. Sick Horses Coming to their Master's Tent for Help. Horses in Mosquito-stricken Districts. Horses at Night. Their Confidence in the Human Watchman. Necessity of never Relaxing Vigilance in Securing Horses. Horses as Night Guards. Approach of Dawn. Preparations for a Day's Hunting. "Chota Hazree." Observations of the State of the Weather. Native Guides. Drinking-water in Waterless Districts. Personal Comfort on Hunting Expeditions. After-riders and Native Followers. Mr. Gordon Cumming on Comfort in the Field. "Alforjas." Carrying Guns on Horseback. Cavalry Carbines. Mr. Galton's Namagua Bucket. Falls and Broken Gun Stocks. Dented Gun Barrels. Hunting in the Early Morning. Native Trackers. Trails in Wet Grass. Marks upon the

Ground. Transitory Marks. Fossil Tracks and Impressions. Permanent Earth Marks. Buffalo Willows. Beaver Meadows. Game Paths. Mountain Tracks. Old Trails. Disappearance and Reappearance of Blind Trails. Sun-baked Plains and the Trails of Game. Passing Feet among Short Grass. Trails among Rocks and Hard Ground. Australian Blacks as Tracksmen. Sun-dried Footprints. "Droppings." Old Waggon Trails. Searching for Game. Startled Game Spread Alarm among other Animals. The Sound of Shots. Laying out a Stalk. Game and the Wind. Game Rarely look Uphill. Moving Objects and Game. Sentinels of Game Herds. Cross Winds. Stalking Game in Unfavourable Positions. Driving Game towards the Gun. Game Passes among Hills. Pursuit of Startled Game. Gralloching Dead Game. Vultures and Dead Game. Carrying Dead Game on Horses. Hunting Trophies. Wounded Game. Gunshot Wounds. What a Gunshot Wound feels like. Instances of Wonderful Vitality after Wounds Received. Recovery of Apparently Dead Animals. Approaching Supposed Dead Dangerous Animals. Insensibility to Fresh Wounds by Mortally Wounded Animals. The Tracking of Wounded Game. Night Shooting. Seeing Gun-sights in the Dark. Difficulty of Observing Effects of Shots at Night. Rifle Pits. Making a Shooting Hole. Shadows During Moonlight. Dewless Nights. Night Glasses. The Sequence of Arrival among Game. Caution as to Shooting Accidents at Night. Jungle Shooting in India at Night. Sir Samuel Baker on Night Shooting. Construction of Platforms in Trees and on Scaffolds. Antiquity of Peasant Farmers Watching their Fields at Night. Watching for Game by Day from Blinds. Mountain Shooting. Necessity for Keeping Above Game. Scent in High Winds. Mountain Sheep. Night at Great Altitudes. Sleeping Bags against Great Cold. Mountain Caverns as a Refuge at Night. Mountain Sheep, Goats, and Antelopes on the Thibetan Table-land. Great Herds of Game in Thibet. Game in the Winter Snows. Nutritive Lichens at Great Elevations in these Mountains. Reindeer Moss. Saxifrages. Food of the Arctic Game. Peculiarities of Life at Great Elevations. Shooting of Guns Affected by Rarefied Air. Advantage of Long Barrels for Mountain Shooting. Judging Distances among High Mountains. Value of a Mountain Tour in developing the Mental and Bodily Faculties.

A VAST area of the earth's habitable surface consists as we have shown of treeless plains and waterless deserts. The first are great natural meadows whose equatorial margins adjoin the more barren regions classed under the head of deserts, on the other side of which the great bush country stretches away towards the equator, in a vast expanse of plain covered with detached trees and shrubs, sometimes

forming groups and thickets, but more commonly standing well aloof from each other, like fruit trees planted in an orchard, with open grass land occupying the intervening space.

Such in brief are the three classes of country in which the wild sports treated of in this chapter are mostly supposed to be followed.

Horses are here, in nearly all cases, an essential part of the hunter's equipment; the distances are so great, and the area of country to be hunted over so extensive, that a man travelling on foot would be unable to effect much, except at the cost of bodily fatigue and exertion, which few men are equal to endure for any length of time consecutively.

Now although the masses of game animals that regularly inhabit the plains are immensely numerous, on account of this enormous extent of country over which they are free to roam in every direction, it often happens that the hunter may travel right ahead, day after day for long distances, without meeting game in any considerable numbers; indeed several consecutive days may pass without a living thing coming into view, except perhaps some small birds, or a few crows, or other minor birds of prey. Then suddenly antelopes and other game may begin to appear, and the expectant hunter may at last have reached a district where it may be worth his while to halt for a few days, "Hunting and Stalking on the Plains."

It must be evident that hunting conducted under such conditions must be so very different to that carried on among dense thickets and in great forests, that we consider the two classes of sport are better

treated of separately, as distinct branches. Such are the reasons which have decided us to treat the subjects of Forest and of Plains Hunting under separate headings.

Here it may be desirable to explain that the terms "hunting" and "hunter" are used in these pages in the sense of "a seeking after game," as is often done in books which treat of wild sports abroad: they by no means indicate that the sportsman is necessarily mounted on horseback; in forest and jungle hunting for instance, the use of horses would in most cases be out of the question.

The fundamental principles under which hunting must always be conducted if success is to be reasonably hoped for, remain however essentially the same, both in the forest and in the field.

The direction of the wind must be attended to, so that the game may not scent the hunter; and the hunter must so manage as to see, and work silently up to his game, before the game sees him.

But in most other respects, the two sports have to be conducted under conditions which differ widely from each other.

In the forest, all baggage and other impedimenta must be carried by the hunter and his attendants, either upon their backs, if the thickets are very dense, or else upon pack horses or mules, or by boats plying upon the water-ways. On the plains as a rule wheeled vehicles can accompany the hunter almost everywhere; and most of the hunting, that is to say the search for game, is done on horseback; sometimes also the game is run down and shot from horseback, in which case on account of the wear and tear of horseflesh from

fatigue, and the numerous falls and other accidents, which lame and temporarily lay up horses, a very large stud of expensive animals must be provided; it is therefore more usual, and on the whole in most cases the better practice, to dismount on approaching game, and either tie up the horse, or else hand it over to be led by an after-rider.

Then again, in distinct opposition to the practice in forest hunting, where a glass is seldom of much use, the possession of a good field-glass is a *sine qua non* with the hunter upon open plains. When approaching the crest of an eminence in the game country, the whole ground in front must be carefully scanned to see if it contains game. If the plains are perfectly treeless and very level, the presence of game may generally be detected by experienced eyes at very great distances, at which it becomes a question whether the dots visible upon the horizon are living creatures or merely stones or bushes.

It is quite wonderful with what unerring precision the native dwellers upon wide plains and deserts will distinguish what such objects are, without the help of a glass; and so quick and expert does long practice make these men that they generally catch sight of those distant specks, and make out exactly what they are, long before a novice from the settlements can see them at all, even with his glass. The whole thing is however, there can be little doubt, merely, as we have explained in the previous chapter, a matter of lifelong habit of constant observation, rather than any special gift of superior eyesight; it may therefore be regarded merely as a striking example of the wonderful way in which our senses may be sharpened by constant exer-

cise, until they appear to the duller observer as almost supernatural. *

It is a common practice when in a possibly hostile neighbourhood, or where tracks show that game which is invisible has recently crossed the trail, for caravans to send forward one or more experienced plainsmen to reconnoitre the country ahead, so as to obtain the earliest intelligence of what is passing in front; and on the great western prairies of America a regular "sign language" has been invented among the Indians, by which their scouts can communicate or telegraph back information from almost incredible distances. These men will frequently show themselves on commanding points, so far to the front or on the flanks that to the inexperienced eye they appear as mere black dots in the distance, and yet an accomplished guide acquainted with the Indian sign language finds no difficulty, not only in watching their movements, but in deciphering the information which they desire to convey. To a minor degree this plan has been adopted by European cavalry vedettes to signal that the enemy is in sight, by galloping right or galloping left in a circle, as the case may be; but it has never been brought to anything like the perfection to which the sign language has arrived among the Red Indian prairie tribes. We do not now refer to heliographs or flashing light signals at night, or other scientific apparatus in use among Europeans, for conveying information from a distance, but merely to what the unaided man can do in signalling to his friends, without

* Contrast these observations with what we have said as to the prevalence of short sight among city children.—See Vol. ii., p. 12.

the help of anything but keen eyes and a knowledge of the Indian sign language.

Indian scouts are, or were, employed by the United States Government at almost all its military frontier posts in the Indian country, their services being invaluable, and indeed indispensable to the success of operations against hostile tribes of Indians. When a United States military force was on the march through a hostile neighbourhood, Colonel Dodge describes the mode of procedure as follows:

"On the march, the leader or interpreter is kept with the commanding officer of the troops, while the scouts are sent far in advance or on the flanks. Occasionally he (the scout) shows himself, sometimes a mere speck on a distant ridge, and the interpreter will say at once what he desires to communicate. I learned some of these signals, which are all simple and entirely conventional. For instance, a scout rides up to the top of a hill, walks up his horse, stands motionless for two or three minutes, and then proceeds at a walk. He means, 'All right, no signs of an enemy.' Another will dash up at full speed to the top, and ride rapidly round in a circle. He means, 'Danger—get together as quick as possible.' These and similar are ordinary signals, used by all plains Indians. The only really wonderful thing is the very great distance it can be read by the Indians. While with an excellent glass I could scarcely make out that the distant speck was a horseman, the Indian at my side would tell me what the speck wished to communicate. Indian signallings and telegraphings are simply modifications of the Sign Language." *

The regular sign language by means of which members of different tribes unable to speak each other's

* *Our Wild Indians, 33 Years' Experience among the Red Men of the Great West*, by Colonel Richard I. Dodge, U.S.A., 1886, pp. 432—33.

language, can hold a conversation in dumb show, is naturally on most occasions used when parties meet each other on the prairie, and desire to ascertain whether the approaching strangers are friends or foes, or to talk upon any subject of interest after they have met; this is done almost entirely by manual signs impossible to give an idea of here, the nearest approach to which in European experience is the act of beckoning to a friend, by which sign you tell him, "Come here, I want you;" and the deaf and dumb alphabet, by which people can talk to each other on their fingers, by spelling out the words with the sign for each letter; —of which method naval signalling by flags and flash lights is only another form—of that by which the sign language signals are conveyed under a different code.

The wonderful development of the visual organs attained by practice, whereby objects and details can be deciphered at amazing distances, is a faculty which it is highly important that the traveller over wide plains should endeavour to study, and develop in his own person as far as he can, and there can be no doubt that an immense deal can be done in this way where the sight is naturally good—and after a time the intelligent traveller will find himself readily taking in at a glance details in the landscape which would certainly escape the eyes of careless or inexperienced observers. A good illustration of this may be found upon occasions when the trained eyesight of guides detects some object in the far distance, which is invisible to your own eyes, yet when it is pointed out and you catch sight of it at last, you find it is then visible without difficulty, showing that it was want of practice alone which rendered your eyes unable to see it from

the first. Another and perhaps a still better instance in point is, when a trained hunter points out the form of an animal crouching in the grass close by, or a bird perched upon a rock, which had till then escaped observation, yet when once seen the object appears so clearly visible that it is hard to understand how it could have escaped immediate detection until then.

There can be no doubt that a good glass is a great aid in making out the nature of distant objects, but no glass will make untrained eyes detect details which are invisible simply through dulness of vision, arising from inexperience. By concentrating the gaze upon one particular point in the field of view however, objects are often caught sight of by means of a glass, which would otherwise have remained unseen; especially so, when they approach very closely in colour to the surroundings. A glass will then clear up the perspective, so as to render them at once readily discernible against the background. If one looks again, however, without the glass, one can in most cases see the objects more or less clearly with the unaided eye, though it may be in a blurred and very indistinct form. What however we desire to impress upon our reader is, that the glass that is of most use upon the plains in general service is by no means the telescope of high magnifying power, and with an idea of making the invisible visible; but rather a glass of *low* magnifying power, with as large an object lens as possible, which will act as a clearer, and brings details of visible objects distinctly into view.

A few technical details about telescopes and field-glasses may here prove useful. According to Sir Robert Ball, Astronomer Royal for Ireland, the finest

examples of the greatest telescopes, in astronomical observations, can hold a star within view 1000 times as far off as it would be visible with the unaided eye. While as regards the power of sea or field glasses: the low-power binocular glass used now by mariners has the seeming effect of reducing distance to about one-third (that is to say, an object three miles off is seen as if it were but one mile distant), and a good hand-telescope of considerable magnifying power to about one-tenth (*i.e.*, an object ten miles off to apparently one mile). *

It will thus be seen that the power of a good hand telescope is very great; and if the state of the atmosphere is favourable there can be no question as to its absolute superiority over the binocular field glass. A stag for instance can be made out, lying upon a mountain side, by the aid of the former, which would probably escape detection with the latter. Indeed Mr. Grimble, who is an authority on Scotch Highland deerstalking, goes so far as to assert that, "Binoculars of any sort are not of much use (on bare hillsides) as they cannot be made powerful enough to distinguish stags, etc., at any great distance." †

We must however be permitted to point out that this dictum (which we do not for one moment question the correctness of) must be accepted by the hunter with many reservations. If for instance it is foggy, or the atmosphere upon a mountain is decidedly misty in the distance, or if there happens to be any mirage present on tropical plains: then a glass of this kind,

* Extracts from Report on a Lecture on Astronomy and Telescopes, by Sir Robert Ball, Astronomer Royal, in the Dublin *Daily Express* of November 9, 1889.

† *Deer-Stalking*, by Augustus Grimble, 1886, p. 17.

possessing a high magnifying power, becomes almost useless; because it magnifies the mist or mirage and thus causes all objects to be indistinctly seen; indeed when mist is prevalent among the hills, or the ground is quivering with mirage, the use of a glass of any kind often becomes for this reason impossible, and one can see better with the naked eye than in any other way. There are however many occasions when the atmosphere is unsuitable for the use of a telescope, when a good clearer, or low-powered binocular, with as large an aperture as possible, proves of the greatest possible value, and enables objects to be made out quite distinctly which would almost certainly have escaped observation by all except very highly trained and keen-sighted plainsmen. For this reason we venture to assert that in the long run a good binocular will prove much more generally useful than a telescope. Should the traveller however be possessed of waggons or other means of carrying a fair quantity of baggage, he will certainly do well to take both a telescope and a binocular. He can himself carry the latter, and his after-rider or gun-bearer can carry the former, protected by a strong leather case.

But there is another substantial reason why the binocular should be preferred to a telescope, where only one form of glass can be carried; and this is, because the constant use of high-power glasses, even of the very best kind, is exceedingly trying and ultimately injurious to the eyes. This we have no hesitation in positively asserting. No set of men, for instance, have to make such constant use of glasses as naval men. Well, they have with one consent almost entirely discarded the use of the telescope, for both the above

reasons, for general use. It is however still retained for special occasions, as for example for reading off signals, or examining a distant ship upon the horizon, in clear weather; for these purposes the telescope retains all its acknowledged pre-eminence; but for all the ordinary requirements of constant daily service, the binocular has practically entirely superseded the telescope, both as a matter of convenience, and because it is much the more generally useful instrument of the two.

This is especially so by night. In former days two telescopes were in general use at sea, one for day, and the other (a low-power glass with a larger eye-piece) for use at night, when telescopes of high magnifying power are of no service—for the purpose that is of clearing up dark objects so as to distinguish them against a dark background. For this a good binocular has been found to be by far the best of all night glasses, and we believe nothing else is now employed for such purposes on shipboard during the critical operations of going in and out of ports by night.

The importance of having lenses of as large a diameter as possible, in binoculars for land and sea service, has already been alluded to. These limits are however irrevocably fixed, as they must in no case exceed the distance, measured from centre to centre, between the pupils of the owner's eyes. A glass chosen to suit an individual therefore requires to be accurately adjusted to this axis.

Now the width of the human face of course varies considerably in different people, but the average distance between the eye centres may be set down at $2\frac{5}{8}$ inches. A man however who wishes to have things

right, will take care to see that his optician makes his glass to fit his eyes, instead of trying to make his eyes fit the maker's glasses.

There remains the question of the material of which the mountings of glasses should be made; the greatly superior lightness of aluminium is incontestable, but it is far less strong than brass, and the threads of the screws in the softer metal are liable to be injured by frequent use, or by any rough handling. Moreover, apart from the much greater expense of aluminium, it does not stand severe changes of climate as well as its older rival, and at sea the salt water rapidly deteriorates the new metal, aluminium being to a certain extent soluble in chloride of sodium. Whether therefore in a wild country, where all articles require to be strong to withstand the constant knocking about and the general wear and tear of hard service, a traveller would be well advised in adopting aluminium in place of the more serviceable brass, is a matter which we may well leave to our reader's intelligence, with a view to his own particular tastes and requirements.

In all hill shooting the glass is called into constant requisition, and a good one of some kind is almost a *sine qua non*, as on account of the rugged nature of the ground game may at any time be within view, among rocks or hollows, where it cannot be easily seen; or may be lying concealed among bushes or ferns, from whence they can see anything that approaches from the leeward side, and most game animals make it a regular practice to lie down facing the wind, with this intent. In consequence it becomes a matter of high importance to approach the crest of any eminence

with the greatest caution, as the figure of a man suddenly shown up against the sky-line, is sure to be at once detected. Hunters therefore generally take advantage of a rock or any other bit of cover, which enables them to creep up without exposing their heads to view, while they take a careful survey of the ground beyond. Neglect of this precaution is pretty sure sooner or later to start deer or other animals which were there unseen, and which in their flight communicate the alarm to every other beast within sight of them, along the whole mountain side. This shows the necessity of carefully examining ground with a good glass, so as to detect the presence of game before they catch sight of the man.

When the respiration is laboured after a climb, or when a strong wind is blowing, it sometimes becomes difficult to hold a telescope steady upon a small object which it is desired to inspect, when there is no natural rest available on which to steady it. Mr. Grimble considers—

"The best spying position is to lie nearly flat on the back, with a stone or tussock of grass to rest the shoulders against; then drawing up the knees, hold the glass firmly against the left knee, and you will be able (he says) to hold it perfectly steady in a high wind;"—while, "if there is but a gentle breeze, the walking stick planted firmly in the earth will give sufficient support to keep it steady."*

It requires however some practice in the use of a glass to search a hill-side properly, especially with a telescope; but with *good* binoculars it is a much easier process, and difficulty is rarely experienced in holding them steady.

* *Deer-Stalking*, by Augustus Grimble, 1886, p. 32 (A plate is given of this position to face p. 33).

The vast expanse of ground over which the eye can range upon wide plains, very often conveys the erroneous impression to the beholder of its forming a perfectly level surface, similar to the prospect seen at sea, either from the deck of a vessel or while standing on the beach, looking out to seaward. As a matter of fact however, very few plains, however flat, really at all approach this uniformity of level; this will be readily seen by turning slowly round, so as to take in the whole panorama on every side, when it will generally be found that one can see much further in some directions than in others—thus showing how far removed the surface around varies from a true plane. Moreover if there are streams, their generally shallow but rapid current at once proves that the land inclines considerably in some particular direction; if the streams are dry, the traces of former torrents will tell the same tale in other words.

In our chapter on Climates and Temperatures, the rainstorms and peculiar character of these plains rivers will be found fully described; it will therefore be unnecessary to repeat these details here. We may however just say that the great plains regions everywhere are almost always subject to these rain bursts, which form quite one of the phenomena of plains travel that require always to be watched by travellers.

Another of these phenomena which from a hunter's point of view requires to be taken into account, is the peculiar condition to which the atmosphere, especially upon dry plains, is subject. "English sportsmen" (says the great Dr. Livingstone) "though first-rate shots at home, are notorious for the number of their misses on first trying to shoot in Africa. Every-

thing is on such a large scale, and there is such a glare of bright sunlight, that some time is required to enable them to judge of distances." * In fact we may add to that, that taking a few trial shots occasionally at objects placed at unknown distances, is the only way in which a new-comer can bring himself into accord with the novel conditions to which he has become subject. These apparent differences in the perspective, which might perhaps pass unnoticed among persons who as non-sportsmen might never have the fact forced upon their observation, are everywhere felt by riflemen unaccustomed to the plains regions, the moment they try their hands at shooting on wide plains.

We beg respectfully to call the attention of the British War Office, and of all soldiers, to this fact; troops taken out from home will infallibly find their shooting greatly affected by it at first, and until they become acquainted with these new conditions and have adapted themselves thereto, the difficulty is likely to be permanent. In all wide, treeless plains, where there is nothing to assist the eye in forming an estimate by comparison with adjacent natural objects in the landscape, this difficulty will be sure to arise, whether the country be of a flat character or not; the same thing for instance occurs in mountain regions, when the shooter tries his hand there for the first time. We mention this with such insistence because of the exceedingly bad shooting made by our troops in the late war in the Transvaal, † upon ground which we have since carefully studied; and we can have no doubt that there was a good deal of the optical illusion

* *An Expedition to the Zambesi*, by David Livingstone, 1865, p. 309.
† The Boer war took place in 1881.

above referred to, which exercised its effect upon the conduct of this war: while the Boers, we need hardly remind our readers, were firing under the conditions to which a life's experience had accustomed them, and were therefore wholly exempt from this disadvantage. *

The difficulty experienced by the new-comer, in the way of judging distances upon plains, arises as we have said, partly from there being nothing to guide the eye in forming its estimate of distance, as is generally the case in England and other thickly inhabited countries. The same phenomenon however recurs upon our coasts and at sea, whenever inexperienced persons attempt for example to estimate distances over water—say of ships in the offing, or the width of an estuary, also of coasts seen from on ship-board; and as we know the most ridiculously extravagant guesses are frequently made on such matters, showing how widely the eye may be deceived under such circumstances. †

For this reason it is usual in all our coast defence forts to have a regular table of ranges posted up in every battery, showing the ascertained distance of every remarkable object in the landscape, in order to prevent as far as possible the misdirection of fire in this sort of way.

But in addition to the difficulty of judging distances arising out of the foregoing conditions, there is another

* N.B.—In the Boer war the country was mountainous, but treeless, and consisted of grass-covered hills.

† An amusing "catch question" for instance, is to ask the height of an ordinary top-hat, measured from the brim to the top of the crown—the replies will exhibit the extent of the optical illusion to which the top-hat gives rise, and the error is generally equal to quite 50 per cent. of the whole height—this in an article that can be held in the hand while the guess is being made, is remarkable. Our attention was originally called to the fact by a professional hatter.

set of causes which comes into operation upon dry plains subject to high solar temperatures, caused by local peculiarities in the state of the atmosphere itself—to which we desire to call our readers' particular attention. This is irrespective of the curious vagaries of mirage, which causes everything to vibrate exactly like the waves of hot air that may be seen rising from a heated iron plate. It has all the effect of an exhalation of gas from the surface of the ground, and when it is present in any marked degree it so distorts all natural objects in the landscape that it is impossible to be sure of either what they are, or how far off they are. Anything like accurate shooting therefore, when there is much mirage, is out of the question.

But there are other occasions, when the exceedingly clear and transparent nature of the atmosphere (due in a great degree to the abnormal absence, or rather the dispersal of vapour through space) is so perfect as to exhibit all objects in the distance as if they were much nearer at hand than they really are: thus constituting another optical illusion of the most remarkable kind. This condition of the atmosphere may arise at any time of the day, but it is most common (so far as our humble judgment goes) in the early hours, because the prospect is then generally uncomplicated by mirage, which as a rule only prevails after the earth's surface has become heated by the powerful rays of the midday sun.

The larger the object, of course the greater will be the deception; rocky hillocks or a bush-covered mound will thus appear to be only a short distance ahead; but in reality they are quite a considerable way off, as the traveller soon discovers in moving towards them. This illusion is however best seen in its most

exaggerated form, in the case of distant mountains, visible upon the horizon.

We may quote as an admirable instance of this the striking panorama of the great range of the Cordilleras de Los Andes, viewed from the plains region of the western seaboard in South America. We feel sure that all those who have travelled much in this dry and sun-stricken expanse will at once recognise the existence of the facts we are about to relate. * The barren, desolate slopes of the mighty mountain chain, sharply silhouetted upon the eastern horizon, will be seen uprising out of the plain with a minute distinctness of detail which would actually lead the observer to suppose that he was within an easy day's journey of their base (that might be, say, fifteen or twenty miles), yet in reality they are 100 or perhaps 120 or more miles away.

The traveller however continues throughout the day to plod along upon his course, yet when the evening has come, and brought the labours of the day to a close, he will very likely see the great mountains not only no nearer than they were in the morning, but as if they were actually farther away than they were at the beginning of the day. The explanation of this phenomenon is, as we venture to believe, somewhat as follows: the slanting rays of the evening sun bring out into view a curtain, or transparent cloud, of exceedingly fine and almost impalpable dust, which everywhere and especially in all dry regions, so far as our observation goes, seems to fill the lower stratum

* As regards the peculiarities of the meteorological conditions of this region, we beg to refer the reader to our chapter on Climates and Temperatures, Vol. i.

of the atmosphere, but which while the sun shines high in the heavens, remains most generally invisible.

An illuminated ray of light thrown across a dark room in our own country will demonstrate the existence of this dust, which has been treated of elsewhere in these pages. When however it becomes irradiated upon the plains, by means of cross rays from the evening sun, the dust thus brought into view so far impairs that apparently perfect clearness of the atmosphere of which we have spoken, as to destroy the intense sharpness of detail with which the mountains were previously exhibited, which caused them to appear so near at hand in the morning: they therefore then are seen as if they had been set back to a greater distance from the spectator. Such at least is the inference which we have ventured to draw from this remarkable phenomenon.

The blue haze which fills the air in dry tropical regions, during the hot season, has been made the frequent subject of remark by travellers. Its density is such that at times it has all the effects of a regular fog, and restricts the range of vision to a comparatively short distance. In the intensely dry state of the atmosphere, when even dews are often conspicuously absent, we can have no doubt that this misty appearance is due to dust clouds. Dr. Livingstone seems to have been of the same opinion, for he mentions the existence of this haze in several passages in his travels on the Zambesi, and also refers to the extreme clearness of the atmosphere, and the great distance at which objects became visible after the advent of the first rains,* which would have the effect of carrying down

* See *The Expedition to the Zambesi*, by David Livingstone, 1865, p, 64.

with them a good deal of this dust, and also of checking the uprising of fresh clouds of it with every eddy of air.

Sir Joseph Hooker in the same way adverts to the enormous distance at which the great range of the Himalayas becomes visible from the Indian plains, at this time—"In the rainy season and immediately afterwards" (he says) "the snowy Himalayas are distinctly seen on the horizon fully 170 miles off." *

These facts show the extreme clearness which at times pervades the atmosphere upon the plains, especially, as we have said, in dry regions; whereas on the other hand air saturated with moisture, as it is in damp tropical districts, is generally more or less misty in the far distance. But in dry tracts the perfect limpidity of the atmosphere is frequently so complete that the perspective becomes so altered from what we are accustomed to at home, that it makes it very hard to say how far off objects seen upon the plains actually are.

The inexperienced eye therefore almost always considerably under-estimates the distances, and the young sportsman finds at first that his shots fall considerably short of the mark, until he has acquired some little experience of the new conditions he has to contend with. This has the effect of producing a reaction on the mind, which probably causes ranges to be over-estimated for a while, so that some little time elapses before things find their level, and before anything like good shooting becomes possible. For this reason it is all the more important to lose no opportunity of testing

* *Notes of a Naturalist in Bengal and the Himalayas*, by Sir Joseph D. Hooker, Vol. i., p. 86 (originally published in 1855).

the shooting powers, by trial shots at marks at unknown ranges, and practising the art of judging distances correctly.

Over-estimation of distances being almost certain to result in constant failure and disappointment, requires to be particularly avoided; when the aim is too high, the shot of course goes clear over the mark and is absolutely wasted; on the other hand when it is too low, there is always the chance of a "ricochet," though as a rule the shot is apt to be deflected very wide of the mark aimed at. We cannot doubt that all these circumstances combined did exercise a fatal influence upon the shooting of the unfortunate British troops employed in the Boer war, and thus entailed the complete failure of every enterprise.

We have ventured to insist upon these matters with almost obstinate iteration, because in an art requiring great accuracy like rifle-shooting, such results appear to us the almost necessary sequence, when the shooter is called upon to exercise it under entirely novel conditions. Sportsmen will therefore do well to lay these maxims to heart, if they expect to be successful in a hunting expedition upon wide plains.

Practice at birds and other small game with a pea-rifle, will be found a useful method of obtaining preliminary experience, and it has the great advantage of not disturbing a wide extent of country, as is frequently the case, especially among mountains, when heavier weapons are employed. Personally we are of opinion that there is no way in which a man can improve his shooting more quickly than by the use of a pea-rifle at small objects at moderate distances. This principle has been carried out to an extreme

point among military men, by the use of the Morris Tube, * with miniature charges and projectiles, at quite short ranges, in rooms and barracks and other confined spaces, with very great success in improving the shooting power of soldiers, as we have been assured by competent judges.

Still target practice, though undoubtedly of the highest value in its own way, and indeed probably an almost essential preliminary to acquiring the art of rifle-shooting, will not of itself alone, in our humble judgment, make a man a really good shot at game in the open field. To become that there must be the practical experience in shooting at living and moving animals. This axiom never received a better illustration than it did in a rifle match between the 14th Hussars and a party of Boer riflemen, held shortly after the close of the war at *Ladysmith*, Natal, in 1881. Here, notwithstanding that the hussars had only their short regimental carbines, and that the Boers were armed with long-barrelled Winchester rifles, the Boers were easily defeated, showing that though at long distances and at targets the British soldier more than held his own, still the sad fact remained that they could not come at all near the Boers in the field, where the marks were living and moving objects at shorter but unknown distances. † A British sergeant serving in the regiment at the time describes the event in a few words, given in the forcible style of barrack-room speech,

* An invention of a Mr. Morris, by which a small bore tube is slipped into an ordinary gun-barrel (sold by the Morris Tube Company, 11, Haymarket, London).

† See letters in the London *Times* of Jan. 10, 1894, signed "A King's Hussar;" of Jan. 11, signed "A General of Cavalry;" three letters in *Times* of Jan. 15, 1894, and one in that of Jan. 25. The ranges seem to have been 200, 300, 500, and 600 yards.

and says: "In *Ladysmith* we knocked tin pots out of them. We beat them by 70 or 80 points—I forget which—" *. The secret of the Boer failure in this case is easily explained. None of these men understood trajectory, and the moment they attempted to shoot against British soldiers who had been carefully coached up in the theory of rifle-shooting, and tried to shoot at ranges beyond the 150 or 200 yards which they were accustomed to fire at, they failed utterly.

One man seems to have been so astonished at the results, that he thought that there must have been some trick or deception in the range, and stoutly maintained that if any two of the British team would undertake to shoot against him on his own ground, the matter would end differently. His offer was promptly accepted by the Hussars, and the match came off at his place, the target being a stone with a bull's eye painted on it, and the ranges 430, 500, and 700 yards; and he was of course again easily beaten. †

The truth is, target shooting (as commonly practised) is an entirely distinct branch of rifle-shooting, mostly carried on at long range—whereas game shooting is almost entirely done at short ranges; if a man can shoot well up to 200 yards, that is enough for sporting purposes, indeed sporting weapons are seldom sighted for longer distances. Consequently (we trust we shall be pardoned for saying it, though we do not desire to include British officers in this assertion) soldiers are generally exceedingly bad shots at game; in the United States army for instance, there are (or were) many

* Letter of Sergeant Simmons, late of the 14th Hussars, of January 9, 1894, in London *Times*.

† See letter in London *Times* of January 25, 1894, from Major Hamilton, 14th Hussars.

more opportunities for soldiers becoming sporting shots than among our own, we have the authority of Colonel Dodge for saying, "they are generally as poor shots as can be found." * We might cite several reasons for this, besides that of want of practice at game. In the first place the "pull off" of all the old military weapons at all events, is much too hard, the trigger being set, for various military reasons, at nearly double that of the sporting weapon; then again the sights are too coarse for a good sporting rifle. Of course if the soldier lays aside his military arm and takes to a sporting weapon, then he no longer shoots as a soldier but as a civil sportsman.

But to proceed with the more immediate subject under consideration. Let us now suppose that the hunter is out on the plain in quest of game, and that he is at length approaching the goal of his hopes, a great game country, inhabited by various sorts of wild animals.

For days perhaps the signs of game have been visible all about, but the droppings and the tracks are some days old; and the animals that made them have long since moved off to other pastures, where all trace of them is lost in the vast extent of the pathless wilderness. There is probably no old hunter whose heart does not kindle at the recollection of these first days of hope and expectation, and recall how as a youthful sportsman, he eagerly scanned these tell-tale traces, and speculated upon the particular creatures that made them, and how long ago it was since they did it; probably

* *The Hunting Grounds of the Great West*, by Colonel Richard I. Dodge, U.S.A., 1877, p. 106.

while listening, as if to the Oracle of Delphi, to some old hunter then beside him, as he pointed out (as if he had been there to see them) the various descriptions of animals that had been on the ground.

Let us now suppose that the first outlying stragglers of the herds have been sighted. Ought he to stop the march of his caravan, and try his luck off-hand?—Or ought he to wait for some future and more favourable opportunity?

This brings us to the vexed question of travelling and hunting while on the march. Of course lucky chances of getting game in this way will every now and then present themselves, which it would be foolish for the traveller not to avail himself of—but experience shows that the practice is not as a rule attended with very satisfactory results. It usually entails the expenditure of much labour with very small returns, especially if it be conducted on foot.

If the hunter spends his time in beating up covers, or stalking game visible at a distance in the open plain, while the caravan continues its journey, he will most likely find himself left behind a considerable distance, and must subsequently overtake his party either by running or riding after it. The weight of any game he may succeed in obtaining will of course materially increase the labour of doing this—and he may lose his way and get left out on the plain, for the night at all events.

It would be impossible as a general rule to halt and wait for the hunter, as that might entail being unable to reach the next water before sundown, and other contingencies. It is therefore usually necessary for the march of the caravan to continue uninterruptedly.

Halts with a train of laden pack mules or cattle hitched up in the waggons, also materially increase the fatigue and length of the march, and diminish the periods necessary for feeding and resting, before the journey has to be resumed. On no account therefore should pack animals be delayed by halts, unless they can be unladen.

If hunting and travelling are to go on concurrently, it will in consequence generally be necessary to be provided with good horses, and one or more attendants to assist the hunters when required, and help in packing in the game. It will however actually be found far more advantageous to halt and rest the animals for a day or two in camp, in some place near good grass and water, where the prospects of obtaining game are promising, and from thence sally out to collect trophies and lay in supplies of meat, some of which can be salted or dried and carried on for the use of the party.

If however game is plentiful, it will generally be sufficient to go into camp early in the afternoon, when enough can be obtained to supply the wants of the party without interfering with the progress of the journey on the morrow.

Also, when the camp is fixed at some known spot, it is easier for guides to lead the sportsmen back to it than to depend upon cutting in upon the trail, and overtaking the party before darkness shuts out the chance of being able to distinguish the trail of those who have gone on ahead.

These considerations among others therefore, generally point to the conclusion that it is at best a questionable policy to make a general habit of hunting while the party is on the move. There will be occasions when it is necessary and proper, but these will mostly

be exceptional. Regular systematic hunting it is true can be done, and is constantly done along the line of march, by skilled plainsmen who manage their movements with such dexterity that it is rare for them to get left out all night, involuntarily. But things generally turn out differently when a non-professional hunter attempts it: his movements are sure to be hampered by want of time, and he is generally obliged to hurry, and this in nine cases out of ten is fatal to success; and we can only say, there have been more accidents in the way of people getting lost, caused by this practice, than have occurred in any other way.

Another plan, at one time much in vogue on the prairies of America, and in South Africa, was the practice of running game with horses, and shooting while in full career from on horseback, which certainly has the advantage of giving the ardent sportsman an exciting run, while combining to a certain extent the home and foreign styles of hunting. In the old buffalo days in America large numbers of these splendid beasts were often killed in this way, as the herds were often so large that they became wedged up in a dense mass, so that the movements of those in front hampered those behind, and prevented them using their best speed. It was then comparatively easy with a good horse, not overweighted, to ride right in among the rear ranks, and kill, slay, and disable, as fast as the hunter could load and fire; there were but two things to be avoided: one was riding too far into the herd, so that buffalo got in rear of the hunter and could charge into his horse's hind-quarters and upset both horse and rider; the other was shooting an animal so close alongside that when it fell the horse was apt

to fall over its prostrate body. Buffalo hunters in those days, when of course only the muzzle-loader was used, used to go into action with a quantity of loose powder in one pocket, and the mouth full of bullets. A handful of powder was then poured haphazard into the gun, a wet bullet was thrown down on top of it, small enough to run easily down the barrel; then a cap was put on, or the flint-lock primed—and bang! went the gun again. Sometimes a man would kill several animals to his own gun in this way, in the course of a single run; but more often many shots were fired and a man got only one or two, or perhaps none at all; for in the confusion it was often difficult to say how many the hunter had killed, while large numbers of wounded animals got away, only to die miserably, after days and perhaps weeks of suffering, by becoming the prey of the numerous white wolves which hung upon the outskirts of the great herds, on the look-out for victims.

Still it was an exciting scene while it lasted, and formed a bright picture in memory's pages in after-days, which the old hunter loves to look back upon; and personally we esteem it a privilege to have witnessed and shared in many an exciting chase upon the great hunting grounds of the Far West, in the grand old days now gone, when buffalo were plentiful, and game of all kinds abundant.

The Prairie Indians in former days were noted for their skill in "making a surround," and killing vast numbers of buffalo in this way after a regular cavalry skirmish, and as the result of many personal encounters between man and beast, the prairie was sometimes strewn with the carcases of the slain, like a regular battle-field. We

think it will be perhaps both interesting and desirable to recount the history of one of these great battues, from the pen of the late Mr. George Catlin, the well-known writer upon, and painter of, Indian life and scenery. This incident occurred in 1832, while he was with the Sioux tribes, in days when the Indians had not yet generally obtained possession of firearms; the weapons used were therefore the time-honoured national ones of their own manufacture, namely the bow and arrow, and the lance.

The historic Indian bow and arrow merit a short description, which forms a suitable introduction to the grand mêlée which follows:

"The bow," says Mr. Catlin, "with which they are armed is small, and apparently an insignificant weapon, though one of great and almost incredible power in the hands of its owner, whose sinews have been from childhood habituated to its use. Its length is generally about three feet, and sometimes not more than two feet six inches. The greatest number are made of ash, or of bois-d'arc, lined with sinews, which give them great elasticity. One of these little weapons in the hands of an Indian, is a most effective and powerful one on the open plains. The horse is trained to approach on the right side, enabling the rider to throw his arrow to the left. It brings the rider within three or four paces from the animal, when the arrow is thrown with great ease and certainty to the heart——" and instances sometimes occur "where the arrow passes entirely through the animal's body. An Indian therefore, on a fleet, well-trained horse, with his bow and quiver containing a hundred arrows of which he can throw (discharge) fifteen or twenty a minute, is a formidable and dangerous enemy. No one can easily credit the force with which the missiles are thrown and the sanguinary effects produced by them, until he has ridden with a party of Indians

in chase of a herd of buffalo, and witnessed the apparent ease and grace with which their supple arms have drawn the bow, and seen the huge animals tumbling down and gushing out their heart's blood from their mouths and nostrils." *

Then as regards the plan of attack, it is entirely under the orders of their most trusted chiefs, who call together their men and issue their directions beforehand, all of which are implicitly obeyed by everybody, as, if a failure was to result from some act of disobedience on the part of any of the young men, it would certainly go hard with the offender. The general plan of a "surround" is described by Mr. Catlin as follows:

"The hunters drew around the herd a mile or more from them, and the circle gradually closed in at a signal given. The herd at length got wind and fled. When they tried to escape the Indians galloped in brandishing their weapons and yelling in a frightful manner; the buffalo were thus turned back in an opposite direction, where they were again met in a similar manner, by which time the horsemen had closed in from all directions, forming a continuous line. The massacre now began with arrow and lance. In this great turmoil a cloud of dust was soon raised which in parts obscured the throng. In this way the hunt soon resolved itself into a desperate battle, and in the space of twenty-five minutes resulted in the total destruction of the whole herd. I could not distinctly estimate the whole number that were slain, yet I am sure some hundreds fell in this grand mêlée." †

Mr. Catlin on the whole visited some thirty tribes of plains Indians, so that he had ample opportunities

* *Manners and Customs of the North American Indians*, by George Catlin, 2nd edition, 1841, p. 33.

† *Ibid.*, Vol. i., pp. 199 to 201 abbreviated from Catlin's account (this incident occurred in 1832, and was conducted by the Sioux Indians, then the most numerous and powerful of the prairie tribes).

of furnishing the best and most reliable details; this was however before the days when these wild hunters became possessed of firearms, which it may well be doubted if they found a real improvement upon the old weapon for this special purpose, though of course as a war weapon to be used upon their forays the gun was immeasurably superior to the old bow and arrow, as also in all cases where the hunter was unable to get within pretty close quarters of his game, for the power of the arrow rapidly falls off with distance.

The Indians, during the second half of this century, had however almost all of them obtained firearms, and only carried the bow as a reserve, in case of accidents.

Their guns, of which we have inspected many, were light single-barrelled flint-lock smooth-bores, carrying an ounce ball, mostly of English manufacture, and so far as we could learn, among the northern tribes at all events, had been in great part obtained at the trading posts of the Hudson Bay Company in exchange for peltries; these were plain but efficient and good guns; but there was another class of weapon flashily got up, sold by 'cute Yankee traders; these guns were unmarked with any maker's name, and in our opinion the barrels often consisted of bits of gas pipe or some such material, so that it became an open question, which was the most dangerous, to fire off these guns or to be fired at with them. As may be supposed numerous accidents occurred by these things bursting, and the poor Indians have frequently exhibited to us shattered hands and other grievous wounds sustained in this way. It is impossible to conceive anything more contemptible, cruel, and wicked, than

selling these things as firearms; and we always took good care to denounce the practice, and to point out that that was not the sort of thing done by the "King George's men." *

During a run with buffalo, Indians never used to measure their powder charge, a handful was put in by guess work—fortunately some of it got spilled and did not enter the barrel at all, and also the powder they used was of a very poor quality, not nearly so strong as English sporting powders: this probably minimized the mutilations that were of such constant occurrence. In fact the white plainsmen boldly asserted that a great hunt rarely came off without somebody losing his hand, or being otherwise badly hurt.

Indeed this practice of loading with loose powder was a bad and dangerous one for white men's guns; and personally we preferred to make up ball cartridges for use on such occasions; at other times a military breech-loading carbine, of the U.S. "Sharp" pattern came in useful.

The falls that hunters were exposed to while running buffalo were often very serious; the ground was often exceedingly rough, and at times full of buffalo wallows, at others honeycombed by holes made by moles, gophers, and other small burrowing animals. The dust also, if the plain was dry, rendered it impossible to see anything but a confused mass of raging quadrupeds, flying headlong from their deadly enemies, so that avoiding obstacles was almost out of the question.

* The Indian name for "the English" (These arms, we ought to say, were surreptitiously sold mostly by illicit traders, as the free traffic in firearms, at the time we speak of, was forbidden by the U.S. Government. The American people were therefore in no way responsible for these iniquities).

Few persons therefore followed the sport long without coming to grief by falls. Broken bones—resulting from falls from horses, galloping furiously after game—are serious matters out on the plains far from surgical aid, and we have known quite a number of persons who have suffered in this way, more than one of whom could exhibit that curious natural deformity, a false shoulder joint—the shoulder having been smashed and there being no means of getting it set, Nature in the end extemporized a species of artificial joint up near the collar bone. The arm in such cases generally remained stiff and greatly impaired in power, but still serviceable for many purposes. We mention these matters because it is as well for people to know the penalty that sometimes attaches itself to these wild gallops across the plain.

On the other hand it is perfectly astonishing over what rough ground game of all kinds will go, at top speed, without accident. They have however merely their own unencumbered weights to carry; still their activity and sure-footedness are remarkable, as they will rush away in blind panic over rocks and stones, precipitating themselves down steep banks into ravines and watercourses, at break-neck speed, which regarded in cool blood it would seem impossible for them to cross in this way—yet they generally come out all right on the other side. The only thing that seems to pound them is soft ground, and the history of the plains is full of examples of whole herds of animals getting "mired" and suffocated in this way. Sometimes this may occur from sheer stupidity, but more often we are inclined to believe, something stampedes the herd, and in their headlong rush, in which they

will go over anything and everything, they fly from an imaginary danger in the rear to inevitable destruction in quagmires. where those behind push forward those in front, and finally gallop over their prostrate bodies.

The risk to horses in these hunts is of course very great, and if a man has but one or two animals to carry him, running game is of course an act of suicidal folly. Even if the horse does not get hurt and disabled these wild bursts of the chase take a great deal out of a grass-fed animal, and soon break down his strength and condition, on which in the latter end the comfort and perhaps even the life of the traveller may depend.

If therefore a man determines upon hunting in this way he should take care to be provided with a stud of horses for that express purpose, which in general requires to be a faster and more expensive class of animals than those used for ordinary riding.

The question of how many horses a man (to whom expense is no impediment) should be provided with, if he intends to make a practice of running game, is one not easily answered, as so much will depend upon the nature of the country and other circumstances; and we have come across but one instance of a man who has ventured to put on paper what number in his opinion will be required for South Africa, where the practice of running game has been largely employed. This has been done by Mr. W. C. Oswell in his chapters on South African hunting, contained in "Big Game Shooting," of the Badminton Library Series. This is what he says—

"On horseback your whole day is a pleasure to you, mind and body—whereas on your legs it is often a wearisome, un-

successful tramp. Men going into Africa for shooting should be very careful in the selection of their mounts, and get the aid of some local friend or trusty acquaintance in their purchase. For a season's shooting eight or ten trustworthy animals, and five not quite so costly for your after-riders, will, with luck, be an ample provision. The number seems large, but accidents, sore backs, hard fare, and hard work, must be taken into account. You may sometimes do with fewer no doubt, but there ought to be a margin for loss. Men who go to Africa with the idea that game will come to be shot, will find their mistake." *

The late Mr. Oswell was a great advocate for the plan of running game with horses, and his undoubtedly great experience of African hunting, which extended back upwards of half a century, should cause his opinions to have considerable weight. He considers that in portions of Africa very little can be done without horses; and that—

"success depends enormously upon your stud, for the country is generally too open for stalking; and he (the horse) carries you up to your game, in most instances, as near as you like, and it is your own fault if you don't succeed. Had I been the best shot ever looked along a rifle, I would have done but a trifle without horses, in comparison with what I accomplished with them." †

Most African hunters have given the system a trial, and there can be no doubt that it is one which has many attractions and advantages; but it also has its disadvantages, and questions of this kind ought not to be decided off-hand, without looking at it from every point of view.

* *Big Game Shooting* (Badminton Library Series), Edited by Clive Phillips Wolley, with contributions from various sportsmen; 1894, Vol. i., p. 104—in paper on "South African Hunting," by W. C. Oswell.

† *Ibid.*, Vol. i., p. 103.

Now-a-days, it is necessary to go very far up into the tropical regions before any game worth speaking of is seen, and there the bush country takes the place of treeless plains, and tsetse fly, and the African horse sickness are often rife. In the tsetse country neither cattle nor horses will long survive, and where the horse-sickness prevails, the only horses worth taking are what are known as "salted horses," that is animals which have had the disease. Like most of the zymotic diseases of the human subject this disease seems rarely to be taken a second time—a salted horse is therefore considered safe; nevertheless many so-called "salted horses" die of it: either because they have not really had the true "sickness," or because they are sometimes liable to take it again a second time. A very long price has to be given for good salted animals, say £60 or £70; the risk is therefore great, though in the South African colonies the money is generally returnable if the horse dies within a certain time of the distemper. Great difficulty however is often experienced in getting it back.

As for unsalted horses, the colonial people have a saying that when the horse-sickness is present, "a man never knows whether he has a horse or not." He may have a complete stud at the beginning of the week—at the end of it he may have none left. He may have a good horse in the morning, and it may be dead at night. We have known a man to start out on the veld with a trap, and good pair of horses, and to return in three or four hours, riding one horse, and leaving the other dead out on the plain, and the vehicle has not been able to be got in perhaps for days—people would not risk horses to go out for it. We have known

ladies in a frontier settlement to go to church on a Sunday, and arrive at the church door with their horses all right, and find one of them dying when they came out.

In running game with horses, all authorities seem to agree that the best policy is to press the chase to the utmost, *at first.* Most game have great "bottom," and can keep going longer than the best horse, carrying a rider—and though certain sorts of game may be quickly run up to and "blown" by a "burster" at first go off—yet if the chase is a long one, they will frequently gradually recover their wind, and seem then to increase their speed, and finally often make good their escape in spite of every effort to overtake them. The works of African travellers are full of such instances, and American experiences are identical. This is now so well known among hunting men that we do not deem it necessary to quote authorities to prove it, but merely to state an ascertained fact. As regards the colour of horses for this work, Mr. Oswell advises against grey horses, as he considers they are seen sooner by game than animals of another colour; moreover grey horses are apt to be somewhat soft and delicate, at least that is our personal belief. Everything almost upon dry plains is brown or dun-coloured, and where there is much sand, the animals and birds will be of a sand colour; it will therefore of course be desirable for the sportsman to accommodate his dress, etc., to match the landscape, and curiously enough on dry plains many horses are found assimilating to their colours. Some of the very best horses are also often of this colour.

Having now given an impartial consideration to the

"running" system, we must do the same to the alternative plan of stalking game, which we have no hesitation in saying we believe will ultimately be found the noblest and the most successful form of this sport; and if we err in this view of the matter, we think that all events we shall be able to show that we do so in very good company.

There are two plans by which game may be stalked in an open country. First, the work may be entirely done on foot, and the game walked up to or stalked, as in a Scotch deer forest. This however in hot weather under a tropical sun, where distances are great and the game wild, will be found a very laborious plan; it will prove a severe trial to the best walker and the strongest constitution; and none but a very active, ardent sportsman, we think, would be likely from choice, to follow it long. Mr. Frederick C. Selous is however a living instance of its being performed with eminent success, and probably few African hunters have ever done better than he has done.

Secondly, horses may be used to carry the sportsman from place to place and bring him safely up, unexhausted by a long tramp, to the vicinity of the game. He then dismounts and stalks the game on foot.

Probably more game is brought to bay in this than in any other way, it being the method best adapted for use on all ordinary occasions, while the running down plan is prudently reserved for special occasions, when suitable ground and descriptions of game present themselves.

Mr. Gordon Cumming for example, who had unsurpassed opportunities of forming correct conclusions on every point connected with South African hunting, quickly recognised this fact, and distinctly states his

decided opinion that, "recklessly riding after game, although highly exhilarating, is not the way to fill the bag"—in "hunting on this system an immense amount of ammunition is expended with little profit." *

Let anyone try a few shots, fired from a galloping horse, and he will see how impossible accuracy of fire becomes without an enormous amount of practice in the art. Therefore even though a man range right up alongside of an animal, he may miss the fairest shots, or if he hits in most cases will only inflict a wound, without securing his quarry. Probably there was no class of game better suited for running than the American buffalo, but had this system alone been tried against them, it is probable that many herds of them would still exist. The buffalo was exterminated not by the horse and rider, but by the still-hunter; the murderous Yankee skin-hunter, taking advantage of the stupidity of these great animals when attacked by hidden foes, used to crawl up to within easy range of a herd, and then taking what was called a "stand," at some suitable point, he shot down buffalo after buffalo before the remainder of the herd, which stood stupidly staring in the direction of the noise, took fright and galloped off.

Most species of game, as we know, are greatly alarmed at the sound of firearms; buffalo however, probably mistaking the report for some of the electrical phenomena so common on the prairies, did not take fright unless they saw or smelt their crafty enemy—and instances are on record of large numbers being thus killed, from one stand by a single man. Colonel Dodge for instance mentions several such cases, in one

* *Five Years of a Hunter's Life in South Africa*, by R. Gordon Cumming, 1850, Vol. i., p. 63.

of which the rotting carcases of 112 animals, killed thus, were seen lying dead on quite a small extent of ground. * We fear much the same sort of thing has of late years been done by Boer shooters in South Africa, where the game has been either driven away or exterminated over a vast territory, covered in Mr. Gordon Cumming's time (1843 to 1848) with enormous numbers of every kind of splendid game.

It was not however with a view to countenancing the slaughter of great numbers of living and beautiful creatures (a practice which we have always held in abhorrence), that we have made the foregoing remarks; we mention these matters with quite other intentions, namely to show that the maiming of many horses and much game, by recklessly riding over every obstacle and firing at full gallop, was not the best way of killing game.

Then as regards the plan of going after it without horses, entirely on foot, it must be remembered that there is a limit to human capabilities for resisting fatigue, and that in the trackless wilds the distances to be contended with are so great, and game often so widely scattered, that a man often requires all the help he can get from the services of a steady and faithful shooting horse, before he can make even a fair bag.

After upwards of thirty years pretty continuous service and experience of plains life and sporting on the North American prairies, Colonel Dodge thus expresses himself with regard to his hunting experiences—

"A good steady horse is of inestimable value; a mounted man can always hunt over a much greater extent of country, and see further among bush, than if on foot, and when

* See *The Hunting Grounds of the Great West*, by Colonel Richard I. Dodge, U.S.A., 1877, p. 136.

approaching game can dismount, and either tie up his horse or give him to an attendant to hold, while he creeps up and obtains a shot; and if the game moves off, or is wounded and gets away, he can mount again and follow without exhausting himself by running on foot, and thus unsteadying his nerves when he requires to use his gun." *

This seems to be but common sense. Then again there are many kinds of game which are so swift of foot that it would be quite useless to ride after them. This is best done when large herds are fallen in with: crowds interfere with the movements of game as they do with those of men, and it is often possible to ride up within shooting distance of a large herd, where a single animal of the same species would in all probability tire out both horse and rider, and effect its escape in the end. Now game is mostly met with in twos and threes; this is the time when the stalking plan on foot is so successful, whereas by reckless riding after a small group of animals a whole country-side is disturbed, and all game driven away for many miles in advance.

We will now suppose that the plan of stalking game with the aid of a shooting horse is decided upon, and that the sportsman is proceeding to make his arrangements accordingly.

The principal requisite in a horse for this purpose is that he shall be quiet and steady; a flashy, fiery beast that is nervous and frightened of a gun, and of the smell of wild animals, is a perfect nuisance, and by his restlessness causes many fair chances to fail.

A good shooting horse must of course be sound of wind and limb, and ought to be strong, hardy, and

* *The Hunting Grounds of the Great West*, by Colonel Richard I. Dodge, U.S.A., 1877, pp. 110, 111.

active upon his legs; it is also certainly desirable that an animal should be possessed of a considerable amount of speed, as well as endurance, qualities which may prove of the greatest possible value in emergencies, as for instance in the pursuit of dangerous game, or where hostile natives may be encountered.

Messrs. Nicholls and Eglington, in their recent book on South African sporting, have some good observations about shooting horses, which we shall give a summary of:

"Speed and endurance (these gentlemen say) are of course necessary, but if unaccompanied by proper training, are in themselves alone of very little value. Novices are as a rule quite satisfied if a horse will stand still on a shot being fired from its back; but it is a matter of far greater importance to possess an animal that will permit its rider, when dismounted and standing by its head, to let off repeated shots, without attempting to run away, or he may from sheer nervousness, just at the critical moment when its rider is about pulling the trigger, tug on the bridle, and destroy the aim. With a little patience, and at the cost of a few rounds of blank ammunition, most horses ought in a short time to be taught to stand fire steadily; but even in the most difficult cases this can be accomplished by tying the head by the rein to the stirrup iron, and if on firing an attempt at bolting be made, the animal will be compelled to run in a narrow circle, a proceeding of which it will rapidly tire, and ultimately stand perfectly still." *

Hardly less essential than standing fire, is that the horse should be perfectly quiet to mount; a horse that begins to caper about when game is on the move, and his rider requires to mount quickly and be off, is a

* *The Sportsman in South Africa*, by A. Nicholls and William Eglington, 1892, pp. 19 and 20.

terrible nuisance, and is also apt sooner or later to cause some accident to one's guns, such as a broken stock, or dinged barrel.

The lamentable death of the late Prince Imperial of France in a nameless skirmish in Zululand, in June 1879, was brought about precisely in this way. His horse became restive the moment the Zulus opened fire, and before the poor boy could succeed in mounting, they ran in upon him and speared him.

Sir Samuel Baker also, when in the Soudan, on his way to the discovery of the sources of the Nile, was as nearly as possible killed on one occasion in the same sort of way. In this case an elephant charged down upon him while he was trying to mount a frightened shooting horse.

As for the loss of game and of shots, most of us have probably at one time or another met with disappointment and inconvenience from this source.

In South America, the Gauchos always make a practice of blindfolding their horses when they want them to stand perfectly steady; as a rule a blindfolded horse is afraid to move, and stands under almost every sort of circumstance stock-still; with troublesome mules the practice is almost a necessity, while loading and saddling, etc.

Another most serious eventuality is a horse running off when he sees his rider approaching with the intent to catch him. It may be said that it is a man's own fault if he leaves his horse loose so as to be able to do this; as a rule this charge may be "a true bill," but there are times when it may occur when no precaution could have prevented it; as for instance after a fall, when perhaps the horse has come down

and thrown his rider. We merely mention the matter here, without any intention at present of giving an exhaustive account of the various stratagems which are employed to meet this eventuality.

Prudence however will always dictate the necessity of invariably tying a horse up securely, when about to leave him and go off to take a shot at game, unless he is left in charge of a trusty after-rider. We have the keenest recollection of the inconvenience and labour which results from a failure to prevent a horse breaking loose, on such occasions, in our own person; it is no joke to see one's horse go trotting jauntily off, in the middle of a wide plain, far from all help; while the rider toils painfully after him, trying to coax him "to come and be caught" without success. Some horses have a fashion of waiting till you are getting near, and then suddenly bolting away again; and many animals have been lost altogether on the plains in this sort of way; especially so if the rider is thrown when in pursuit of a herd of game: the thunder of innumerable hoofs, the dust and excitement, make some horses crazy at such times; and as soon as they regain their feet they go galloping off with the rest, and are soon lost to view, perhaps for ever.

In the important matter of purchasing horses for the field we would say here just a word to caution inexperienced travellers against being induced to purchase corn-fed animals. If one is going out some considerable distance from the settlements, it is seldom practicable to carry oats, etc., on account of their bulk and weight; and all experience shows that corn-fed horses fall off very rapidly when put upon wilderness fare; their fodder will then consist of what grass, etc., they

can pick up. It is a great mistake to suppose that grass-fed animals are too soft for hard work. The wild horse, which has often splendid physique and endurance, has never had anything but grass, which is the natural food of horses—not corn.

At the same time, we do not for a moment deny the value of corn for horses worked like a London 'bus horse, or for carriage work of any kind, where most of the work is trotting. If corn could be picked up in the field like grass, of course we would always be glad to get it for our horses. But this cannot be. Again, the work to be done by the animals used by travellers and hunters, is quite different to that for which horses are mostly wanted at home.

In a wild country, when the party are accompanied by baggage animals, as is generally the case, all travelling is done at foot's pace—the ground is too rough, and the distances too great, to admit of "carrying on," and hurrying the beasts beyond their natural pace; the traveller who does so would soon find out his mistake. This constant steady work, day after day, does keep the animals, and the men also, in a thoroughly sound, hard condition; and on an emergency distances can be, and have been, accomplished by grass-fed frontier horses and cattle, which put all our preconceived notions of what a horse can do to the blush. Indians for instance flying with stolen horses and other plunder, from the pursuit of enraged whites, or before the advance of a military force, have frequently been known to perform distances with grass-fed animals which would seem to be altogether incredible in point of time and speed. These things show therefore that such animals, upon any sudden emergency,

can for a short period of time at all events (which in general is all that is required) do quite as well as any of their corn-fed companions.

A grass-fed horse can therefore carry his rider from day to day, and take an occasional short run after game, without hurt. If it is a good animal it is quite equal to any reasonable amount of work that can fairly be expected of him, without falling away seriously in condition. We have seen horses, fed merely upon the natural grasses of the plains, after months of such work, done with judgment while carrying careful riders, come into the settlements in excellent condition, and as sound in wind and limb as when they set out.

We might number several of our own horses in this category, which produced when sold actually more than we originally gave for them. All our horses used in wild countries, we may add, were *unshod*. It is not at all necessary to nail iron shoes to the feet of horses when travelling over the natural surface of the earth. The demand for these protections to the natural hoof has arisen solely in consequence of the artificial conditions under which horses have to work in civilized lands, upon roads constructed of the hardest possible materials, where grit and gravel are continually wearing away the feet. Upon the great plains however these objections cease to operate, and horses very rarely indeed get anything the matter with their feet for want of shoeing. On the contrary the whole foot (including the frog) rests evenly upon the ground, and we have no doubt that horses are much less liable to stumble and fall than they are when shod. The absence of broken knees among Indian ponies, we have noticed, is in consequence

generally remarkable; though they are frequently ridden at speed over the roughest ground—nevertheless their feet and hoofs are generally perfect, and free from many of the diseases which affect European horses. We think we shall be borne out in these views by the opinion of the great majority of experienced plainsmen and travellers.

As regards the important subjects of the management of horses, etc., upon the march, the care of them at night in camp, or while out at grass feeding: all these involve questions which deserve such an amount of careful consideration, that it would be out of place to complicate a chapter devoted to wild sports with such details. Here we shall merely say that so far as our experience goes, we have always found domestic animals of all sorts, when in a wild country, to be exceedingly ready to profit by the care, and above all by the protection, which their human owners afford them. They soon become quite alive to the danger from wild beasts at night, and to the risk of separating themselves from their companions, and so getting left behind when the others move off.

These circumstances therefore combine to render such animals generally more biddable, and more easily managed than might perhaps be supposed. Such a horse for instance will very often show the greatest uneasiness if tied up by himself so that he cannot rejoin the other animals, or when he sees his owner going off, leaving him thus helplessly fettered; it is nevertheless true that if he is not properly secured and breaks away, the same animal may give a great deal of trouble: this is because he is a horse, liable to contrary moods, and like many a man wants to shirk

his work, if he can—yet the same animal while running off at top speed, will make his way back to camp and rejoin the rest, if he is able to do so. When animals run right away and get lost, therefore, it is usually after being stampeded and frightened out of their senses by some circumstance which has occurred; they then soon lose their sense of direction, and, like many a man, wander off they know not whither, and so are lost.

A loose horse or ox, which has been some time out with a party on the plains, will keep up with the caravan and travel along with it, of its own accord, quite safely. We have seen the same horse do so for weeks together; it merely had a twisted band of dry hide round its neck, by which it could be caught when required, otherwise it was quite free to follow its own devices, and if it stopped behind a short distance to feed, it would gallop up to the party again, as soon as it saw the distance between them and him increasing.

So a sick or dying animal will come up to his master's tent again and again in search of help and relief from his sufferings, and if driven away, unless he is secured, will in the end die at his door. This is no flight of fancy: did time and space permit we could furnish abundant evidence that such things are of constant occurrence.

This coming to seek relief from his master when in sickness and trouble, is an affecting instance of confidence among the brute creation in the superior intellect of man. Conscious of his own inability to help himself, he mutely appeals to his human protector in the hope of obtaining some alleviation of his sufferings. Instances of this are common and have been repeatedly

chronicled in works of travel. Colonel Parker Gilmore for instance mentions the case of a bay horse of his that had fallen sick, and was rapidly growing worse:

"I cannot (he says) go out of doors without his following me about. Neither sticks nor shouts would keep him from me. This is a curious characteristic of the African horse, and one which I have often noticed before. Let them but get sick, and by a sublime instinct they seek man's assistance to aid them in their infirmity." *

This practice of sick or dying horses coming home to their master's house or camp, was also noticed on the South American pampas by Mr. Hudson, who states that on two occasions he has been a witness to an ailing horse coming home to die. These were half-wild horses—

"that live out in the open and have to be captured with a lasso when their services are required. I retain a vivid recollection (says Mr. Hudson) of the first occasion of witnessing an action of this kind in the horse, though I was only a boy at the time. On going out one evening I saw one of the horses standing unsaddled and unbridled, leaning his head over the gate; and going to the spot I stroked his nose, and turning to an old native I asked him what could be the meaning of such a thing. 'I think he is going to die,' he answered. 'Horses often come home to die'—and next morning the poor beast was found lying dead not twenty yards from the gate." †

Mr. Hudson says he thinks that as at the gate the horse is always unsaddled and released from his fatigues when in health, he comes again in sickness

* *A Ride through Hostile Africa*, by Colonel Parker Gilmore, pp. 302–3.

† *The Naturalist in La Plata*, by W. H. Hudson, C.M.Z.S., 1892, p. 324.

in hopes that he may be released there also of the sufferings which his illness produce. It may be so. We all run to help in time of need, though we may be very independent when the world goes well with us. Why should not the horse do the same? As long as he is well he is often afraid of man, and keeps out of his way as much as he can; but when he falls sick, he thinks better of him, and comes to see if he can cure him, and will return again and again if driven away, to press his mute appeal for help.

So again, when mosquitoes and other flies are bad, horses will gallop up to the smoke of their owner's camp fire, to try and rid themselves of these pests, and will gladly accept a rub down from his hands with that intent. We have seen it and experienced it again and again; and owners will do well always to encourage and cultivate these friendly offices between man and his beast.

At night, if wolves or other beasts of prey are howling around the camp, the presence of the watchman moving about among the animals, and the sound of his voice, will greatly help to restore confidence; even the firing of a gun will in general create only a momentary start: animals are quite aware when shots are being fired to protect their safety.

Nevertheless, all this should on no account cause travellers to become careless, or to rely upon the sagacity and good-will of their beasts; no precaution that can in any way help to promote their safety should ever be omitted; if it is, rest assured the time will come when such folly will bring its own reward in the loss of animals, or in infinite labour and trouble in hunting them up again.

Every animal should be properly secured, so that he cannot break away if he would: oxen should be secured to their trek-chain during the night, and horses to their waggons or to their piquets; in short nothing should be omitted to prevent them from breaking away, always remembering that a horse is a horse, and an ox an ox; and that they are all most liable to panics and to freaks, which it requires all the owner's experience and caution to properly guard against.

We may here just remark that horses make most efficient guards at night, and are most useful in indicating the approach of any suspicious objects from outside the camp. The sense of hearing, and also of scent, in these animals, is very keen; and we can have no doubt that in such respects their faculties become, like those of their masters, greatly sharpened, after an experience of camp life continued for some time. When alarmed by anything, they indicate their fears by a loud snoring noise, and gazing intently in the direction from whence the supposed danger proceeds. The circumstance is, we may say, almost universal amongst Indian ponies, and the horses of travellers generally. If for instance anything takes one of the party outside the camp for a time, during the night, his return is sure to be indicated in this way by the horses. The man at once speaks to them: they recognise his voice, and silence again reigns amongst them; we have noticed this circumstance, as one of the ordinary incidents of camp life which is constantly observable. Similar warnings are also given by cattle, and indeed all other animals, except perhaps camels, each mutely speaking in its own way, of which a short experience of camp life enables the traveller to at once interpret the signi-

ficance; but it would be out of place to go into minute explanations upon such matters here. So also we forbear to go into details about camp management, and the nightly incidents of life encamped in the wilderness. We shall therefore now suppose that the night is drawing to an end; the grey dawn is breaking, and the hunter is about to make his final preparations before starting out in search of wild game, which wanders at large in the mighty expanse of the surrounding solitudes.

The brief repast (the "chota hazree" or "lesser breakfast" of the Indian cantonments) which begins the morning, is quickly finished, and the hunter turns to depart.

But before he does so, we would make bold to offer a few words of advice to young sportsmen, as to the prudence, and indeed the necessity of making a few mental notes and memoranda of certain things which he should always carry in his head, before separating himself from his temporary place of abode, for we will suppose the camp to remain stationary during his absence.

Having decided in his own mind the general direction in which he intends to hunt that day, he should carefully note not only the direction of the wind, but the condition of the weather generally, and observe the set of the clouds, whether they correspond with that of the wind, or otherwise; and note whether the higher atmosphere is undisturbed, or whether the clouds are drifting rapidly overhead.

Nearly all changes in the weather, so far as our humble observations go, may be more or less accurately foretold in this way, as almost all disturbances of the weather at the earth's surface descend from the celestial

altitudes to the earth. If therefore clouds are seen passing swiftly overhead, perhaps in a different direction to the lower current of air blowing at the time, then, even though it be still and calm on earth, a change may shortly be anticipated; on the other hand, if all is still and clear above and below, and the clouds move with the wind, a continuance of settled weather, at least for some hours, may reasonably be hoped for. If the weather is likely to be wet and stormy, such provisions as prudence may deem necessary can then be made to meet it.

It is also of high importance, whenever one is in an unknown country, for the hunter, whether he is accompanied by trusty local guides or not, to take careful note of any prominent feature that may be visible from his camp in the landscape, such as a high hill or other object; this he should take compass bearings of, as accurately as possible, and note them down with their estimated distances in case of accident; as also the general directions of any rivers, streams, etc., and any other details which may help to direct him back to the spot again The compass should be an inseparable part of the hunter's equipment, *never* omitted from his list of "necessaries."

If it is a district where water is scarce, and the water-springs unknown, we would strongly urge the necessity of never, as a matter of principle, going out for however short a distance without some little supply of drink. Personally we believe that for shooting excursions there is no better liquid than cold weak tea. A small flask of good whisky or brandy is however a most useful stand-by, in case of possible emergencies; and if one goes out for the day, a few biscuits, a bit

of cheese, or a few pieces of chocolate, will be found useful adjuncts, in default of a more substantial lunch, which however can generally be obtained by killing some small game, which can readily be prepared for the table in a short space of time, by those who know how.

We are also decidedly of opinion that advantage should be taken of any existing opportunities for conveying with one when leaving camp whatever is necessary to ensure as far as possible personal comfort while in the field. We regard it as a great mistake to neglect to make the most of circumstances in this way. Rains or other sudden changes of weather may occur; or it may be found impossible to return before the following day; the distances to be traversed are often considerable, and game may have to be followed a long way. In such a case the man who takes nothing with him to guard against exposure and unnecessary hardship may in consequence have to undergo much discomfort, and even possible suffering, which might easily have been prevented by judicious foresight, and without unduly encumbering himself and his attendants. This is bad work, and if frequently repeated is sure to tell upon the foolish man's health and constitution, in the long run.

The oldest and the best hunters and travellers are always the cleverest managers in this respect; they never carry one unnecessary article, but are rarely or never caught out in the open destitute of resources in the way of food and extra clothing, to meet eventualities.

It would of course be quite impossible to specify what things should be taken, and what left behind, as this will depend entirely upon the nature of the climate

and circumstances. Experience alone can decide what is best to be done. Means of lighting a fire should however form an invariable part of the hunter's equipment.

But we take it for granted that the hunter does not go out alone; also that he is fairly well mounted, on a good horse, and attended, either by an after-rider, or by one or more native followers, who run alongside on foot; and in this case we will also suppose that he does not intend to risk breaking down his shooting horse by a reckless riding after swift-footed game, which has nothing but itself to carry in its flight. These things then being so, there are therefore means of carrying a good many small necessaries, to ensure a reasonable degree of comfort, in case of being kept out all night, or of encountering a storm. Some of these, such as a blanket and light waterproof, may be strapped across the front of one's own saddle. A small frying-pan and coffee-pot can be carried by an attendant, with such other items as may be deemed necessary, besides the guns and ammunition which must accompany every shooting party.

We deem it however better to quote from the writings of various hunters of acknowledged authority, such particulars as they happen to have furnished us with in regard to their own arrangements upon such occasions, from which our readers will we trust be able to select a list of items suited to their respective needs.

The first authority which we shall quote is Mr. Gordon Cumming, the renowned South African hunter of just half a century ago:

"I had at last (he says) got into the way of making my-

self tolerably comfortable in the field, and seldom went out in quest of elephants without the following impedimenta: A large blanket, which I folded and secured before my saddle, and two leather sacks, containing a flannel shirt, warm trousers, and woollen nightcap, spare ammunition, washing rod (for guns), coffee, bread, sugar, pepper, salt, dried meat, and wooden bowl and spoon. These sacks were carried on the shoulders of natives, for which services I remunerated them with beads. They also carried my kettle, two calabashes of water, two American axes, and two sickles, which I used to cut grass for my bed and likewise for my horses to eat throughout the night. My after-rider carried extra ammunition, and a spare rifle. My own personal appointments consisted of a wide-awake hat, a coarse linen shirt, a kilt or pair of knee breeches, and a pair of veld shoes. I entirely discarded coat, waistcoat and neckcloth, and always hunted with my arms bare. My heels were armed with a pair of powerful persuaders, and from my left wrist depended by a double rheimpy (or strip of dressed hide) an equally persuasive sea-cow jambok (whip). Around my waist I wore two leathern belts, the smallest discharged the duty of suspenders—the larger girdle was my shooting belt."*

In Mr. Gordon Cumming's time, this girdle carried a powder horn and other things now out of date; also a sharp clasp knife, a compass, a flint and steel—which last-named articles the modern traveller should of course carry, unless he takes matches in place of the flint steel; the objection to matches being that they are liable to get wet, and also in very hot climates are dangerous to carry about with one in luggage; in other respects we do not know that Mr. Gordon Cumming's arrangements could be very greatly improved

* *Five Years of a Hunter's Life in the Far Interior of South Africa*, by Roualeyn Gordon Cumming of Altyre, 1850, Vol. i., pp. 383 to 385.

upon—dry socks and shoes, or a light pair of slippers, are however omitted from the list of necessaries carried in the bags; also a butcher's knife and steel, and a small saw, instead of one of the axes, would be both lighter and better. For the bags, instead of leather, which is bad in wet weather, we would suggest the modern brown canvass waterproof kit-bag, closed with a brass handle and padlock, now sold by all outfitters, which is light, durable, and good in every way for carrying spare clothes and other odds and ends.

Cartridges for breech-loaders will now of course replace the cumbersome old plan of powder flasks "et hoc genus omne;" and if the weather is cold a sheepskin sleeping bag, weight just seven pounds, recommended by Mr. Galton, would render a man quite independent of changes of weather for the night. With even less convenient appointments we have many times passed a night of storm and rain in the open field without serious discomfort.

Of course these hints apply to the case of hunting in wild regions only, where nothing can be obtained except what the hunter carries with him, or obtains as the spoils of the chase. If large animals have to be cut up for transport, or their heads and skins saved as trophies, butchers' knives and steel, with a small hatchet, have to be taken, besides a frying-pan or some sort of cooking utensils for preparing an inpromptu meal, and means for lighting a fire. One or two iron skewers, ten inches long, are light and most useful for quickly cooking "kabobs," *i.e.*, bits of meat and fat alternately run on the skewer, and (cooked over hot *smokeless* embers) nicely seasoned with pepper and salt. In this latter case a frying-pan can be done without if

necessary. These can however all be readily carried by the after-rider's horse, or by a native attendant on foot, as suggested by Mr. Gordon Cumming; the latter can keep up well throughout the day, and carry a bundle not exceeding 25 or 30 lbs in weight, even though he has to run smartly for short distances occasionally. For the conveyance of necessaries on horseback, when the hunter is accompanied by a mounted attendant, a very convenient form of sack is the ancient and time-honoured Spanish "alforjas," such as is carried by every muleteer in Spain; they are there generally made of carpet, but may of course be of any desired material, and the traveller can make them himself.

As regards alforjas we may here just explain that they consist of two bags, not unlike the old form of purse, connected by a central piece long enough to allow the bag portions to hang down, one on each side of the horse: the central portion then goes over the saddle, and the rider is seated upon it without being in the least inconvenienced by it.

Then as regards the difficult question of carrying a gun on horseback, this has always been a matter much discussed among military men and travellers generally. Cavalry, as we know, get over the difficulty by carrying shortened guns (carbines), these can be carried on the old Mexican plan in a leather holster or bucket hung behind the right leg, without serious difficulty. Of late years the British cavalry have adopted this system. But carbines are of very little use to travellers except as a special weapon, when running game with swift horses; we have used them thus many times, but on the whole preferred our own trusty weapon with the longer barrels. The

question then to be solved for travellers is, how to carry the ordinary sporting rifle or gun with the least inconvenience and the greatest amount of safety. We shall however merely touch upon what seem to us the essential points in these pages.

There can be no doubt that by long practice guns can be carried, balanced across the front of the saddle in the way usually done by American plainsmen, and so taken along under every kind of circumstance, except among heavy bush; but the plan is open to many objections, and we believe that on the whole the least objectionable way to do it is by the Namaqua method, advised by Mr. Francis Galton, who gives a woodcut of it in his book, which so fully explains the whole thing that comment would be needless. *

For ourselves we can only say that we have carried our gun in this way over literally thousands of miles of ground, under all sorts of circumstances, without a single accident: the stock rested in the leathern case, and all our weapons were fitted with slings like military rifles; the sling hung loose and enabled the right arm to be passed through it, and thus the gun was carried without trouble, when not riding at speed. When it became necessary to gallop the gun was lifted out and carried in the hand; then, in case of a fall, one was not separated from one's gun—an important consideration; and besides, one never gallops except on an emergency, when the gun is mostly wanted for immediate use.

We must however, before closing this subject just call our readers' attention to the light-handled gun-

* See his *Art of Travel*, and method of carrying guns on horseback, published 1872, 5th edition, pp. 241—2.

stocks and thin barrels in use at the present day for sporting weapons; and point out the folly of carrying such a weapon, day after day, on horseback, in a wild country far from gunmakers' shops, so lightly built as to get the stock easily broken and the barrels seriously dented by any ordinary fall.

We can only say, we have been thrown from horses again and again, with our gun too, without injury to the weapon, where it was sufficiently stoutly built;* a falling horse has frequently thrown ourselves and our gun for yards in this way, and yet nothing worse has happened than a severe shaking. Could this, we ask, be done with impunity with lighter weapons such as we have alluded to?

We here feel that to a certain extent we owe an apology to some at least of our readers, on account of the it is to be feared somewhat prolix and technical nature of many of the foregoing details; we must however very respectfully point out that in nearly all works on travel and sporting, the authors are obstinately silent with regard to such matters, as if they were things of too trivial importance to merit notice; but with this opinion we can by no means agree, and we have therefore ventured to strike out a new line for ourselves, in giving such explanations upon the various points as seemed to us desirable to commit to paper.

Success, both in civil and military life, but above all in the life of a traveller, is most often attained by careful attention to minute details.

We will however now suppose all preliminaries ad-

* Our guns were specially built to order for rough work, and are still, after years of hard service in every sort of climate, practically as good as ever.

justed, and the hunter fully equipped, en route to the hunting grounds. If he is going out for the day, it will probably be early, and the tints of morning still visible in the sky.

The ground as he passes along, will have been carefully scanned, to ascertain by their tracks what numbers and descriptions of game have recently passed across it. He will, we doubt not, have secured the assistance of the best local guides and tracksmen that circumstances permit; in that case he will not fail to get his native assistants to point out the distinguishing marks, denoting what were these various kinds of game. Native hunters can generally tell at a glance by what sort of animal tracks were made, and how long ago it is since the creature has passed. This class of information we fear can hardly be taught by books; the young sportsman on taking the field therefore, should as we have before observed, take every opportunity of acquiring all information possible respecting these important and interesting particulars, by diligently questioning his guide upon the subject, and seeking to discover *the reasons* which cause him to come to certain conclusions; the observant sportsman will then make mental note of them, without remark, for his own future guidance. Even if one is of opinion that the guide is "drawing the long bow," or pretending to knowledge he is not possessed of, it is in general good policy, at first at any rate, to appear to be convinced by his explanation. We regret to say very few white men are really good at this sort of thing; it requires a lifelong experience of wild beasts and their ways to become an adept in the art of reading the signs of the wilderness.

"It is not however to be supposed (says the late Mr. Sanderson, a great East Indian authority on sporting matters) that a print visible to an Indian, would not be equally so to a European, if pointed out to him. The skill of tracking lies in first observing and reading what the untrained eye would pass over, or be unable to interpret. When actual footprints fail, trackers are guided by broken twigs, displaced blades of grass, dew shaken from leaves whilst others are covered by it, and other signs." *

Mr. Sanderson, from his official position as head of the Government Elephant-catching Establishment, had peculiar facilities for making himself fully acquainted with these matters, a highly trained staff of native tracksmen being always at his command, who had to watch the movements of the herds of wild animals, sometimes for weeks together, before a capture was attempted.

The last part of the paragraph quoted from his work, as to the following of trails by means of broken twigs, displaced grass, etc., is a matter of actual historical record, and is known to have been practised in America, more than a century ago, by white forest rangers in pursuit of Indian war parties, engaged in carrying off white female prisoners and other plunder.

The circumstance has been cleverly used in the make-up of the narrative of Fenimore Cooper's celebrated novel "The Last of the Mohicans," † in his account of the pursuit and recapture of Alice and Cora which we have already noticed. It is quite worth while to look over the story

* *Thirteen Years amongst the Wild Beasts of India, and Modes of Capturing Elephants*, by G. P. Sanderson, 1879, p. 29 (Mr. Sanderson was chief of the Indian Government Kheddah, or Elephant-catching Establishment of Mysore).

† Originally published in America in 1826, by Fenimore Cooper (born 1789, died 1851).

again, should the reader have time and inclination to do so, for though romantic incidents may be too much drawn upon to keep up the interest of the narrative, the facts themselves throughout the book are mainly historical, and represent actual occurrences in real life, which took place in 1776.* We mention these details because it is common to hear people throwing cold water on such things, condemning them as "travellers' tales," and mere fantasies of imagination. It is a fact however, that the trail of a man or an animal can sometimes be followed almost exactly as described by Cooper, for long distances, without any actual footprints being seen to guide the tracksman. The great mistake the beginner generally falls into is to keep his eyes fixed on the ground, close in front of him, on the look-out for these footprints, whereas he should also be continually surveying the landscape far away in advance, especially when the trail is among grass, weeds, or low brushwood. If the trail is freshly made mere touches to the grass etc. will shake the dew-drops off from it, and cause a slight, but still quite perceptible change in its colour, best seen some distance away, rather than quite near by; the heads of long grass and weeds will also all be seen to have been slightly brushed forward, in the same direction as that in which the creature that made the trail was going—thus placing the question as to the point towards which it was travelling beyond a doubt. The same will often occur upon damp leaves, moss, or especially in dry sand; in these cases little par-

* In our chapter upon the Region of the Great Plains in Vol. ii. we have given an outline of the authentic historical details of this remarkable case

ticles of matter slightly disturbed in position and thrown forward, will show in what direction the game was going, when the trail itself is partially obliterated and no regular footprints are discernible. Bushes on the other hand will generally be seen more or less nibbled by game feeding among them, and twigs, etc., broken. The breaks in the twigs at once point out the direction in which the animal that made them was going.

There are a number of curious facts connected with marks made upon the ground, which we should be very pleased to discuss, were it not that it involves the consideration of a number of technical details too long and too complicated to do justice to in a chapter set apart, like the present one, to the description of hunting and shooting on plains; although some of these facts are of the most remarkable character, exhibiting the workings of wild nature under aspects which we fear have seldom received much attention from scientific observers, and have certainly, so far as we can ascertain, never been written upon.

Most of the marks made by man or animal upon the earth's surface are as we know of the most ephemeral character; like circles in the water created by a stone cast into it by some thoughtless urchin, they quickly disappear, leaving no trace behind. Those made by the passage of a numerous caravan across the drifting sands of the desert, where they are forthwith obliterated by the wind; or disturbances made by human workers in stream-beds or in the surface of sea beaches, below high water mark, are typical instances in point, rapidly wiped out of existence by natural causes at once and for ever.

Yet there are others which, by the operation of

another set of circumstances, may endure for indefinite periods of time: as for instance where the action of the elements happens to spare certain spots of ground, leaving the marks made upon them undisturbed; in such a case mere lapse of time may fail to effect their effacement.

It is true that in reviewing the existence of exceptional cases of this nature, we travel somewhat outside the ordinary bounds of the tracksman's craft; yet all such matters are well worthy of the intelligent hunter's consideration, as examples of how slight traces of man or animals may under certain conditions survive the accidents of time.

These conditions may assume very great and unexpected varieties of form, and human ingenuity may be taxed to its utmost, even to suggest an explanation as to the origin of some of them; take for instance the fossil tracks, left embedded in the rocks, which furnish us with proof positive of how even the most delicate markings upon the ground may be perpetuated and preserved for ever. These consist of ripples made by the tides upon the primeval sands; and also examples of the actual footprints left by extinct mammalia, birds, and reptiles, and even insects, now become hardened into stone. Such things may be seen exhibited in most of our leading museums.

There is also the far larger but no less wonderful class of the impressions left upon the ancient mud by leaves of trees or of ferns, and other delicate growths of vegetable origin, which are found in enormous quantities, and in the most perfect state of preservation, in many countries, and in many different kinds of rock.

But this is not all, for as we have before observed, among the tombs of ancient Egypt, explorers entering sepulchral chambers as yet inviolate, have found still in existence, clearly marked upon the sandy floors, the actual footprints of the bearers who thousands of years before had carried in the mummies to their last resting-places; some of these footprints have been discovered, as clearly marked as if they had only been made the previous day. *

Such instances constitute examples of the preservation of apparently unstable impressions, through non-disturbance.

Then, coming to the case of marks seaming the natural surface of the earth, fully exposed to the action of the elements, which form another variety of ancient tracks whose traces have been rendered more or less permanent, we are again embarked in a long and technical array of curious and remarkable investigations, which strictly speaking are all items of tracksman's lore. Thus the now almost extinct buffalo or bison (*Bos Americanus*) has left practically indelible traces of his existence in the innumerable "Buffalo wallows" with which he has marked nearly the whole of the great prairie region of the Far West. † So also the beaver (*Castor Canadensis*) while banking up the streams in the formation of his dams, has in a great number of cases profoundly altered the aspect of quite considerable areas of land—the dams created

* See *Nile Gleanings*, by Villiers Stuart of Dromana, M.P., 1880, p. 31.

† These wallows consist of shallow basins worn in the soil after rains, by the buffalo working themselves round on the ground, in order perhaps to rid themselves of tufts of their ragged winter coats, or of insect parasites. They are six or eight feet in diameter and perhaps one to three feet deep. The deep examples are the work of several animals using the same wallow, one after the other.

artificial swamps, and the river behind silted up against them, forming a sort of natural terrace, while the consequent floods destroyed the adjacent forest. Many of the forest meadows or natural clearings found occasionally here and there in the primeval forests of North America, own their origin in this way to the labours of the beaver. These places are generally known among American backwoodsmen under the name of "beaver meadows."

Then again, there are the marks left by the migratory movements of game; in some cases these form quite clearly defined roads, worn by their feet as they passed to and fro over them, from generation to generation. Such for instance are the "elephant roads" in Ceylon, made by great herds of these animals in former days across passes among the hills, and along the sides of ravines and other places. Some of these trails are so clearly defined, that there is no reason to suppose they will ever be entirely obliterated, unless destroyed by human agency. The buffalo paths through the "bad lands" in America are of a similar character, and often follow the crests of divides for long distances, where their presence is usually regarded by prairie-men as strong evidence of the best line for crossing these sections of country, as the buffalo, like the elephant, almost always selected the best and most favourable passes from one part of the country to another.

There are also the trails of game, which may be seen seaming the sides of hills and mountains, which though originally formed by the passage of small bands of light animals, such as deer, goats, sheep, or antelopes, passing perhaps at considerable intervals;

still this slight traffic repeated year after year, leaves behind it almost indelible marks, consisting of a blind trail forming a flattened channel in the hill sides, which can often be followed for long distances by the eye.

Then again there are the curious instances of the disappearance and reappearance of old trails, which had seemingly faded away for ever, but which from various causes again become visible. These are mostly seen in long grass countries, and the trails are presumably preserved from destruction by the grass which hid them. A good instance of this, which may be brought home to all our minds, may be seen in any English hayfield, where the grass was cut by a mowing machine; all traces of its work will be entirely obliterated by the springing up of the after-grass in autumn; yet the following spring, just before the new grass begins to grow, every go-round of the machine made in the old grass will again become plainly visible, more so in fact sometimes than it was at the time of the cutting. But like many of the game paths of which we have spoken above, the marks are best seen at some distance off, and when looking down from windows or from a hill-top upon the field. These and many others all form curious and instructive examples of the various ways in which trails perpetuate themselves.

In a wild country inhabited by numerous herds of game, the animals in passing from one district to another generally follow certain well-defined routes; and we cannot doubt that the traces—even where there exists no actual beaten trail—left by the passage of former herds, serve as guides to the others which

follow after. In dry countries more especially there are often regular beaten tracks to be seen for long distances, leading to the springs and drinking pools; these may frequently be seen converging towards the water from several points of the compass. The converging lines of such trails indicate that they lead *towards* and not away from water, and are undoubtedly utilized by game to guide them in their search after the precious fluid; the hunter also finds them useful guides to water. In these dry countries the ground is often baked so hard by the scorching suns of the hot season, that it becomes almost as hard as iron, so that it is distinctly dangerous to gallop at speed over it, as it affords no hold for the horse's feet, which slip as if on stone flags. Under these circumstances of course, distinct impressions of the footprints of animals are only seen in soft places. But faint impressions of the points of hoofs and abrasions upon the hard earth will frequently be left, which are recognisable by slight changes in the shade of colour of the surface. While among short grass, etc., there will be small depressions of and a bending or bruising of the blades by the feet of the passing animals.

Similar evidences may appear upon rocks and other very hard ground, in the form of mere scrapes and scratches, * which however are still sufficient to furnish a clue to a clever tracksman. On the hard dry ground of Australia for example, the native blacks will unerringly follow the blind trail of lost horses and cattle over ground of this sort, by means of what would be almost invisible traces to uninstructed eyes.

* See remarks on this in Theodore S. Van Dyke's *Still-Hunter*, New York, 1888, pp. 149—151.

"Australian black-boys (says the author of the Australian Graziers' Guide) are matchless trackers, and can run the trail of horses if they stray, or guide the party to the last camp, however involved their wanderings, with wonderful certainty." * Or in the words of an old Australian pioneer of very great experience, spoken to ourselves, "All you have to do when you send a black-boy in search of anything lost, is to sit down and wait till he returns. If it is still above ground, he will be sure to find it and bring it."

So also speaking of the Hottentot trackers, Mr. Burchell, chief of the British Government Exploring Expedition at the beginning of this century, thus expresses himself—

"These Africans pay an extraordinary degree of attention to every little circumstance connected with the habits and mode of life of the wild animals in their country, though they so closely resemble each other that few European eyes would see the difference, even if it were pointed out to them. The footsteps of some are too remarkable to be mistaken, but with respect to others, they are obliged to examine not only their form, but even their distance apart, and their greater or less depth of impression; they are thus enabled to tell a heavy animal from a lighter one. In estimating the time since the animal passed, they consider the effect of the weather, sun, wind, or rain. If the impression was made upon wet ground but is partly filled with leaves, dust, or sand, then they know the animal passed since the last shower, but before the storm of wind." †

This paragraph gives a good general idea of the *modus operandi* of native trackers; the hunter should

* *The Australian Graziers' Guide* (Cattle), by Silver & Co., 1881.

† *Travels in the Interior of Southern Africa*, by W. J. Burchell, 1822, Vol. ii, p. 92.

however bear in mind that as a rule (at least that is our experience) the exposure of tracks to a hot sun makes them look much older than they really are; if however the trail is followed up, and it passes over sheltered spots where it was not exposed to these influences, the error may be corrected. For this reason it is always better to be cautious in jumping to conclusions about tracks already sun-dried, unless the native guide is positively sure of his reading of them.

This however makes it all the more important where much tracking has to be done, to be out on the ground early and before the sun has become powerful, in hot countries. Captain Forsyth for instance, an officer of the Indian Forest Service, a man of most acute observation and very great experience, who has written one of the most valuable books of its kind extant on India, states that in Indian hunting this is of great importance "as the breezes which rise shortly after daybreak destroy the fine edges of the impressions (of the footprints of game) and by nine o'clock it is often impossible to tell whether the marks are old or new. *

What the hunter must therefore do on these occasions, is to pay particular attention to the trail, wherever it passes sheltered spots; and above all, keep a bright look-out for any droppings left by the animals, which will at once furnish an almost certain clue as to whether the trail is a fresh one or not. Freshly fallen dung, though it may appear dry upon its upper surface, will generally be found more or less moist on its lower

* *The Highlands of Central India*, by Captain J. Forsyth, Bengal Staff Corps, afterwards of the Indian Forest Service; reprint of 1889, p. 345.

side, if carefully turned over. When he is in doubt, the traveller should dismount at important points, and carefully study all these indications for himself, if he desires to understand clearly the art of tracking and trailing. These droppings however, if only one or two animals are being followed, may only be deposited at wide intervals, the search thus often becomes tedious; if however beds where game have passed the night, are come upon, or lairs where they have rested for any considerable time during the day, droppings will generally be found in their neighbourhood, both liquid and solid, as it is the habit of most graminivorous animals at all events, to relieve themselves in this way almost immediately after rising. We may see this clearly at spots where domestic cattle have passed the night, in fields at home.

The local characteristics of climate, the nature of the soil, and the whole of the circumstances prevalent in the locality, should always be carefully viewed by the hunter in forming his conclusions; for provided the ground be dry, and not disturbed by wind or weather, marks made upon it may remain unchanged for a great length of time. We have seen for instance, what we knew to be our own trail, made upon the plain months previously, when we had passed that way before, really almost as distinctly preserved as if it was of quite recent date.

The marks of the wheels of the carts, and even impressions left by the horses' feet, remained pretty nearly as clearly cut as those of the new one. The explanation of this is probably to be found in the fact of the ground having been soft at the time we first passed, after recent rains, and the marks made upon

it had subsequently become sun-dried. Old trails of this description, made upon dry plains, may, and in fact often do continue distinctly visible even after the lapse of years.

These things show what an amount of trained observation has to be exercised to correctly interpret even so apparently plain a matter as the probable age of a footprint; to be able to do so correctly however, is all-important, as success in hunting depends upon it in many cases.

To recapitulate therefore the main points to be borne in mind about it:

1.—Observe the state of the weather at the time, and also what it has been during the previous twenty-four hours, making mental note of all changes.

2.—Keep the ground far to the front constantly under observation, as well as what is at your feet.

3.—Watch the long grass, weeds, bushes, etc., for indications of the recent passage of animals, brushing through it, as already described.

4.—Examine all marks upon the ground, watch for footprints in soft places and in spots shaded from the sun.

5.—Keep a vigilant look-out for "droppings."

6.—Keep face to wind as far as possible. Where it is calm, test the wind with a bit of feather, or a little dust, or by the smoke of a pipe (if you smoke).

7.—Keep as far as possible to the high ground.

8.—Avoid exposing yourself to view on the crest of a hill, etc., without first ascertaining that no game is in sight on the other side.

For the rest, to tell the exact age of a trail, the kind of animal that made it, and other minutiæ, we

fear that must be a class of knowledge that can only be acquired by long practice in the field, and in the art of following and reading trails. A good deal can however be gathered about human wanderers when their camping places are met with. How many fires had they—allowing about six men to a small fire? Then again, where they have lain down to sleep the mark of the body often remains clearly visible on the ground; where two persons have slept near each other, the standing grass that grew up between them is frequently plainly visible. Then again among Indians and other savages each tribe has its own peculiar methods of camping, so that an expert plainsman can tell at a glance to what tribe the people belonged that had encamped there.

Too much care cannot be taken in scanning the surface of the country in front, as the hunter proceeds, to see if any game is in sight. We feel quite satisfied that for this purpose there is nothing like good binoculars, such as we have already ventured to recommend in preference to glasses of higher power.

It is the greatest mistake to hurry over the ground without sufficient caution; want of care in this respect often results not only in losing the chance of getting shots at valuable animals, but also in causing game which has been lying down in some quiet corner, unobserved, to jump up and scamper off, communicating the alarm to all other animals that may happen to witness its flight. Wild animals of all kinds are extremely observant of the conduct and movements of others; even such creatures as birds, or any kind of small game exhibiting signs of alarm, quickly spreads an alert among all the larger animals inhabiting a

wide stretch of country—and once game has been placed on the alert in this way, they become exceedingly wary and difficult of approach, and very generally take up positions where they can see well in every direction, in which it may perhaps be impossible to get near them without their discovering it.

In short, the governing maxim of the hunter should be to so manage as to see his game *before* the game catches sight of him; if he can do so, there is seldom any insuperable difficulty in getting a fair shot. But when the game has once seen him he may exercise all his arts in vain; it is rare indeed that they will afterwards give him an opportunity of becoming better acquainted with them, and most probably if started they will run a long distance before they settle down again, as startled animals have an instinctive dread of pursuit.

For this same reason it is most undesirable that a country should be in any way disturbed by the letting off of guns near the camp, or by firing at birds or small game for the pot. The sound of shots in certain states of the wind and nature of the country, can frequently be heard at long distances, especially among mountains where the reverberation is often very great, and is carried an immense distance up ravines and passes. For these purposes therefore, a pea-rifle, carrying a light bullet, with very small charges of powder, comes in very handy, as it can generally be used without much danger of disturbing the neighbourhood.

There are however certain sorts of game more liable to be alarmed by the sound of shots than others; such animals, especially if they have been much fired at, generally shift their quarters at once when guns are fired. Some animals however undoubtedly mistake the

reports of firearms for some of the electrical phenomena so common on the plains, and take little notice of shots, provided they are not alarmed in other ways. American buffalo, and many sorts of antelopes may be mentioned as coming under this category.

When game is in sight, the first thing to do, after determining the state of the wind, and before commencing the stalk, is to examine the ground with the glass on all sides to ascertain if there are other animals of any description in the way, likely to interfere with the hunter's movements, should there be a fine animal in view, which it is specially desired to get a shot at.

The contour of the ground must be deliberately examined, and a regular "plan of campaign" laid out, so that advantage may be taken of any inequalities in the lie of the land, such as dry water-courses, ravines, timber, ant-hills, or other descriptions of cover; and the hunter must determine in his own mind which direction is likely to prove the most favourable for stalking.

If the game is lying down the probabilities for success will be all in his favour. Most of the desert animals rest for some hours during the middle of the day, and can be stalked in wide plains and open ground on mountain sides with greater facility and certainty at that time than at any other, when the sun is hottest.

If however the game is feeding, as it generally is in the early mornings and evenings, it is hard to say what changes may occur in their position which may oblige the direction of approach to be altered. This should always be kept in view in choosing the line of advance, so as if possible to avoid places from which further progress might become impracticable.

It may be that a long detour may have to be made, to keep out of sight, or because of the wind; particular note should therefore be taken, before starting, of some remarkable object in the landscape, such as a rock, tree, or hillock, which will enable the hunter to recognise as nearly as may be the exact position where the game is, should it be hidden from sight, after leaving the place where he first marked it down.

When circumstances give the option of doing so it is always better to approach game from above, in hilly districts. The most favourable wind therefore will be a wind blowing from where they are, up-hill.

Deer for instance (according to Mr. Grimble, an acknowledged authority on deer-stalking in the Scotch deer forests) always move up wind when feeding, and when lying on a hill side are usually found to be looking straight down-hill. * They rarely look up-hill, he tells us, and therefore it is better if possible to stalk down-hill. As regards this however it is well to observe that wild animals of all kinds are, according to the author's experience at any rate, always extremely watchful of the sky-line, and instantly detect anything in movement upon it; the greatest caution therefore should always be used to avoid showing oneself where it is possible for game to see the hunter in that position. Many shots are lost by sportsmen from neglect of this precaution—as for instance by crossing ridges within sight of game lying down, which have escaped the hunter's observation. When reconnoitring it is therefore a good plan to come round the shoulder of a hill slightly below its crest, in which position one is less likely to be seen.

* *Deer-Stalking*, by Augustus Grimble, 1886, p. 27.

When approaching game on open ground the advance should always be made slowly, and sudden motions of any kind must be avoided, especially when at close quarters. One of the circumstances that the traveller in a wild country quickly becomes aware of is the fact to which we have already drawn attention, that his eye is at once attracted by anything in motion. The same facility is enjoyed by game, in an even greater degree, and when on the alert they instantly detect the slightest movement of the smallest object. If the advance therefore is over level open ground, destitute of cover, the hunter must creep along as slowly as possible, lying flat upon the chest, and from time to time punting along on the elbows, keeping the hands and feet well down, and carefully availing himself of the shelter of tufts of grass, fern or any other species of cover, however small; thus ant-hills in many tropical countries are most useful to hunters on these occasions.

If he has to creep up-hill he will naturally advance head foremost, but going down-hill it is best to go feet foremost. Under favourable circumstances however, there are generally small undulations of the ground, which even on the flattest plains will materially favour the stalker's progress, and which may enable him even to walk up unseen, within shooting distance. It is obvious that the great art in stalking judiciously is to so lay out the line of advance, that full advantage may be taken of whatever may facilitate action in this way.

If the hunter sees that his approach has been detected, the only chance is to remain perfectly still until the game take their eyes off him; unless he does so, he

will almost certainly be observed. He must wait patiently until they begin feeding again, which they probably will do after a time, if they see the object that has excited their suspicion remains motionless.

Many animals, such as deer and antelopes, have a habit on such occasions of putting their heads down as if to graze, possibly with a view of putting a lurking enemy off its guard, and then suddenly looking up to re-examine the supposed danger, and see if it has in any way changed its position. On such occasions animals of the deer tribe almost always exhibit their alarm by a sudden jerking of the tail, just before they raise their heads. It is therefore better to allow sufficient time for them to do this two or three times before an attempt is made to move. It is a matter of constant experience for travellers to find animals stopping to gaze at them, as they pass, so long as they continue in sight, but the moment they become hidden by undulations of the ground they at once make off, and when the traveller reaches the next eminence the game has vanished.

When sufficient time has elapsed to allow their suspicions to have been lulled therefore, either push on, or else gradually withdraw, moving only when their heads are down, as circumstances may require.

It has been noticed that female animals exhibit greater curiosity, and are often more shy and watchful than the males, and they generally act as sentinels of the herd. The finest animals in the herd are also almost always found to keep in positions so that a lot of the smaller ones are placed between them and points of danger. They seem to have an intuitive perception of the advantage of doing so.

Keen-scented animals of all kinds too, are quite aware that they are most exposed to attack from the lee-side, and their attention therefore is mainly directed to watching anything approaching from that direction.

When the wind is blowing crosswise between the stalker and the game it is therefore generally best to keep somewhat to windward, as he is less likely to be observed in that direction. A side wind may generally be said to be a favourable wind, indeed Macrae, the Highland forester, in his useful handbook of deer-stalking gives it as his opinion "that there are more deer killed by sidewind than by any other, as they generally secure the lee-side from attack." *

When the wind blows across ravines, narrow valleys, and passes, game are generally to be found on the sheltered side in cold stormy weather, and on such occasions if the country is hilly and broken, judgment must be used in the choice of ground, as the wind is apt in such localities to be subject to sudden eddies and changes of direction, and to veer off its course during heavy gusts. High winds indeed are generally unfavourable for stalking on moorlands and open plains, though as we explained in our chapter on Forest Hunting, stormy weather is the very best time for hunting among heavy timber.

When shooting on great open plains, destitute of any kind of cover, should game happen to be found in an unfavourable position, it is sometimes a good plan to send a man round by a long detour, so as purposely to let them get the wind of him, and if possible cause them to move in the direction of the gun.

* *Handbook of Deer-stalking*, by Alexander Macrae, 1880, p. 48.

It is however rather a risky expedient and should only be adopted as a last resource, for it is impossible to count upon the movements of game when once disturbed. If they suspect they are being headed towards a hidden enemy, game will break back in the most determined manner, and will sometimes force their way right through a line of beaters, rather than face the unseen foe which they suspect may be lurking in the opposite direction. Mr. Gordon Cumming, the celebrated South African hunter, usually adopted this plan on the immense open plains there, which were at that time literally covered with herds of game. He used to do his hunting almost entirely on horseback, and his advice in such cases is—

"if the hunter from knowledge of the country can tell the course the game will take, a herd being discovered, the after-rider is directed to remain quiet till the hunter has proceeded by a wide semi-circle some miles to windward of the herd, which being accomplished, the after-rider runs at them and drives the herd towards the hunter, who by riding hard for their line generally manages to get within easy shot as the panting herd strains past him." *

The same thing may however be effected in a quieter way by a man on foot.

Where there are hills, there are generally certain passes among them where the game make a practice of heading for. It is here that a knowledge of the locality comes in so useful, as the hunter can, if he knows these points, station himself in such a position as to command them, and get shots at anything passing that way. It has also been often remarked that

* *Five Years of a Hunter's Life in the Far Interior of South Africa*, by Roualeyn Gordon Cumming of Altyre, Vol. i., 1880, p. 201.

as a rule game are apt to run to windward, more often than down the wind. In hilly districts also, frightened animals generally try to get on top of the highest eminences, from whence they can see everything that approaches from every side; and in such positions, once they have been regularly alarmed, it is seldom possible to get near them again that day.

The best hunting countries however, generally, are neither absolutely treeless plains nor yet heavy forests, but rather a mixture of the two, where small tracts of dwarf bush and single trees alternate with stretches of open grass lands. Such a country is the beau ideal of a hunter's paradise, when it is well stocked with game; there are immense tracts of such land in the Transvaal and other parts of South Africa, where in the good old times all these qualifications were to be found in the greatest perfection; there are also wide expanses of such land in Northern and Eastern Africa, and in America, as well as in other parts of the world, though we fear the "abundant stock of game" has everywhere become rarer.

This is the sort of country where a steady shooting horse can be used with such success; the distances are so vast, as we before explained, that a man on foot can do comparatively little; whereas a well-mounted man can in the course of a day hunt over a lot of country. To do this, a good plan is to go cautiously to the tops of hills and other high ground, and keeping carefully out of sight, get a good look at the surrounding landscape with a glass, and if there is anything in the nature of a considerable herd of animals pasturing on it, the probability is that the hunter will

catch sight of some of them. If not, he must push on quietly, keeping a sharp look-out for tracks; and being mounted, and the bush generally of a dwarf character, he can look over into open glades and other places which he could not possibly do if on foot; and as soon as game has been sighted he can dismount and either tie up his horse, or better still give it to an attendant to hold. He is then free to creep up as close as possible to his game to get a shot, and should the game move off without his being able to fire, he can mount again and continue the pursuit. Attendants should of course be instructed to keep up as close as possible, without endangering the success of the stalk. Thus the hunt can be continued without undue fatigue or exhaustion; and instead of the day being one of severe toil, as it must be if everything is done on foot, hunting conducted under these auspices is merely a pleasant day's sport, and is moreover likely to be very much more successful with the horse than without it.

Should game be killed, it must at once be opened and the intestines removed; if this is not done, a very few hours' exposure to the sun will render the flesh quite unfit to eat. Unless the hunter carries a butcher knife as his "couteau de chasse," butcher knives must be taken for this purpose, also a small hatchet or saw is necessary for dividing large animals. If the dead game has to be left to take care of itself while the hunter goes in pursuit of other animals, the hatchet or the saw is wanted to cut some thorny branches to put over the carcase, to protect it from the attacks of vultures and the smaller beasts of prey, such as wolves, foxes, jackals, etc. The great probabilities are that these sharp-eyed birds, watching from on high, have

seen the kill, and watched the subsequent process of preparing it for table use, and will be sure to visit the carcase and destroy it, unless prevented. Now we must frankly admit that the branches laid over it have of themselves but little effect of saving the body from their depredations, but both birds and animals will suspect a trap on seeing them so placed, and the fear of this will probably keep them off at least for some hours. Even grass, or a rag, or piece of paper stuck on a stick, is better than nothing, if there are no branches. When the hunter comes back again to carry home his game, or whatever portions of it he may require, he will probably load some of it on one or both horses. Animals unused to carrying meat, and being alarmed by the scent of it, often become restive and troublesome; but when they have been accustomed to it a few times they show only a mild species of dislike to the novel burden. It is better therefore to blind the eyes of the horse if at all unsteady, while loading him with meat, by wrapping a coat or cloth round his head, and ropes or cords must be taken to tie the load on him. If there are horns which are not wanted to be kept as specimens, it is absolutely necessary to knock them off with the hatchet, as the sharp horns of an animal tied upon a pack horse may inflict very severe wounds on the animal, should it become restive.

As regards the preparation of hunting trophies as specimens, we would merely here remind the hunter that many heads are completely spoilt by being badly separated from the carcase, and by the skin being cut off too close to the head. When taking off a head therefore, the skin of the neck should be neatly cut round some distance down from it, and skinned and

turned back to the base of the skull, before the vertebrae is divided; this enables a portion of the neck to be stuffed and represented in the finished specimen, which gives a much improved appearance to the head.

Wounded game often gives great trouble to secure it, infinitely more so very often than the original stalk. When game falls to the shot therefore (unless in the case of dangerous animals) it is always desirable, both for these reasons and for reasons of humanity, to secure it as soon as possible. Very often an animal falls apparently dead, but is only stunned, and soon after recovers, rises again, and escapes. The first effect of a severe gunshot wound, both in man and beast, is a temporary collapse of the nervous system. As a rule, unless bones are broken and splintered, gunshot wounds give very little pain in the first instance, the sensation being that of a severe blow with a heavy stick, and any pain given is generally by the exit of the ball (if it goes through) and not by its entry. Thus soldiers struck in front by a ball while in the ranks, have sometimes supposed themselves to have received a blow from a comrade in the rear. A limb traversed by a ball (without fracture of the bone) merely feels heavy, numbed, and useless. We cannot doubt that pretty much the same sensations are experienced by animals as by man, under the same circumstances.

These things being so, to a certain extent explain what is called the "wonderful vitality" of some animals, even after receiving a fatal wound. But did time and space permit we could recount equally remarkable instances, and perhaps even more remarkable cases of it in the human subject. In the museum of the mili-

tary hospital at Netley for instance is to be seen the picture of a British cavalry soldier, whose arm was carried clean off at the shoulder by a cannon ball, at the battle of Waterloo; yet this man mounted his horse again, and rode without assistance the whole ten miles into Brussels, that same evening for medical treatment, and subsequently made a complete recovery, minus the loss of his arm.

It would be both too long, and out of place also, to discuss here at any length the scientific aspect of gunshot wounds; chapters however could be filled with records of cases where game has been struck down to all appearance dead, by a well-directed shot through a vital organ; but presently they have recovered so far as to be able to rise and make off at a rapid pace; and not unfrequently they subsequently succeed in making their escape altogether. To quote instances of these notorious facts would be unnecessary, as they are within the personal experience of almost every hunter. It is always better therefore, where there is any doubt about the matter, to put in a finishing shot at close quarters, the gun being invariably reloaded and got ready before the hunter runs up.

In the case of dangerous animals the greatest caution should however be used, as quite a number of cases have been from time to time recorded of men being killed or desperately wounded by supposed dead beasts "coming to life again." A still living animal proves that the vital spark still lingers in its frame by a more or less perfect respiration, and a supposed dead creature of a dangerous species should be carefully examined at a distance, with a glass, after the gun is again ready. Observe the flank, and see if it heaves at all.

Stones may be thrown at it, as a smart blow has a powerful effect in recalling consciousness, if life still exists.

It is a curious but well-attested fact that mortally wounded animals are frequently apparently less affected by subsequent shots than they were by the original wound. There can be no doubt that this is due to the shock to the nervous system occasioned by the first shot, which to a certain extent paralyzes the sense of pain, and renders the system in this way less sensitive to future shocks. The authorities upon this point are numerous, but we shall confine ourselves to a single reference with regard to it:

"Cases" (says Mr. F. J. Jackson in his contribution to the Handbook on Big Game Shooting of the Badminton Library) "occur from time to time, in every sportsman's experience, in which it seems almost impossible to dispatch a wounded beast, except by a shot in the brain or vertebrae. The wounded animal seems in these cases quite impervious to all sense of pain, being apparently in a state of semi-consciousness after the first shot; the shock of each subsequent shot seeming to have no further effect." *

An animal in this state may therefore be regarded as living in a sort of waking-sleep or trance.

We must venture to disagree with this opinion in so far as the state of semi-consciousness is concerned, in order to point out that in our opinion this condition need not necessarily affect the mental powers, but merely paralyzes the sense of pain, leaving the mind in the human subject in many cases quite clear; and the same in the case of the instinct of the animal (if

* *Big Game Shooting* (Badminton Library), 1894, Vol. i., pp. 202—3 (Mr. F. J. Jackson's paper).

that term be preferred to that of "mind"). A dangerous animal therefore, in this state may be quite as dangerous to go near as when it was unwounded; so may a human adversary; and a savage beast will probably charge with quite as clear a sense of what it is doing in the wounded, as in the unhurt state; indeed if badly wounded, it will be apt to show less fear of danger, because it believes escape by flight to be impossible. So will a desperate man, who believes capture means death.

The sense of pain however being to a great extent in abeyance in such cases, we desire to point out to soldiers and others, should they sustain a severe wound, how desirable it is for them that any surgical operation the nature of their case may require should be performed at once, and before the shock to the nervous system passes off, and while still under the influence of the excitement of battle. It is also a singular and highly remarkable fact that gunshot wounds in fleshy parts of the body, not involving a bone, may be received without the wounded person being at the time aware of having received a wound, and we cannot doubt that the same thing occurs in the case of animals. "Certainly" (says Captain Orde-Browne, R.A., a contributor to the British Naval Annual) "it has repeatedly happened that men have had small-bore bullets pass through the fleshy parts without being very sure whether they had been hit at all. One case occurred in the coal riots in Yorkshire, in 1893, when a miner had been shot through the flesh of the thigh, and only discovered the nature of the wound when walking about subsequently." *

* *The Naval Annual* for 1895, by Lord Brassey, Part. iii, Section ii, p. 36, "Ordinance," by Captain Orde-Browne, R.A.

As a rule however it may be stated, that a bullet wound received, produces little actual pain at first—provided no bone or important muscle is struck; and the shock to the nervous system before alluded to is generally great or small in proportion to the severity of the wound; in all severe gunshot wounds however it is generally very marked, and a partial paralysis of the nervous system supervenes almost instantly after the receipt of the injury; this condition is by the French military surgeons known as "ébranlement."

The thirst of wounded men and animals which is so marked a feature of these injuries is consequent upon the loss of blood, in animals which have not been hunted; but in the human subject the same thirst is doubtless partly due to other causes preceding the infliction of the wound, such as over-fatigue and excitement, as well as to the hœmorrhage.*

Trusting that our readers will pardon our reference to a subject not altogether agreeable to contemplate, we now pass to the consideration of other matters.

There is no time when the value of the gift of tracking and trailing comes in more usefully than when following the traces of wounded game. It does not at all follow that because an animal makes off at top speed at first, that it is untouched; it may do so and yet be found dead a short distance beyond the point where it was last seen. Let us give an instance, extracted from the writings of General Newall:

"I shot a large bear through the heart, which went off as

* These matters will be found fully detailed by a leading British authority, in *Gunshot Injuries, their History and Treatment*, by Surgeon-General T. Longmore, 1877, pp. 145 to 155.

if untouched, but which on following up I found lying stone dead behind a rock 150 yards off! The lesson to be deduced from the frequent recurrence of such cases is, 'Never give up the pursuit of a wounded animal whilst a chance remains.' Humanity, as well as every hunting experience, should inculcate this golden maxim of woodcraft with trumpet tongue." *

In the case of an animal of the deer tribe, a good indication of whether it is unhurt or not is given by its going off with its tail down, as deer always run with the tail turned up when pursued, or when endeavouring to escape from danger. An animal responding to a shot with a violent start also generally indicates that it is hit; besides the thud of the ball can in general be distinctly heard. When a beast is badly hit, if not immediately followed, it is apt to lie down in the nearest place it can find giving the appearance of cover, as for instance among dwarf bush, ferns, grass, etc., or in the beds of streams or ravines; it is therefore, we are inclined to think, on the whole perhaps better in most cases when a wounded animal gets away, to watch it as long as possible, and try to mark it down, should it lie down; but each case must be governed by circumstances, and cases often occur where the only chance is to follow as fast as possible, at once, and to keep a sharp look-out for blood tracks and other traces of the fugitive. Should spots of blood in a frothy state be observed, it is an almost certain indication of a wound in the lungs, and such wounds generally prove quickly fatal if the injury is of a serious nature. Irregularities in the gait of

* *The Highlands of India*, by Major-General D. J. F. Newall, R.A., Vol. ii, p. 76.

going are also important, as they indicate that the animal was staggering, and if so it has probably not gone far. When a beast once lies down, great care should be used not to start it again, as an animal rested by lying down is apt to run stronger than it did before resting and may not be seen again.

Should any conflict arise between a non-dangerous wounded animal and the hunter, the mounted man has a ready weapon of offence, of the club type, in his stirrup irons; a very heavy blow can be dealt with the stirrup, as a weapon, swung at the end of its leather; and its use in this way is an old Australian kangaroo hunting plan, often practised by bushrangers, etc., mentioned among others by Mr. Nichols: "Stepped forward to give a blow with the stirrup iron, as Tom had done in the morning. He swung the stirrup iron to the full length of the leather, and knocked the creature senseless, and ended all further resistance." *

If a heavy animal has to be taken to camp to be cut up for supplies, an old African plan is to cut down one or more good-sized branches or bushes, and laying the animal on these, to have it dragged home in this way, using the branches as a makeshift sledge, which partially saves the hide and meat from injury by the way.

We must not omit the subject of night-shooting, from prepared positions in rifle-pits, or from platforms constructed on trees. For the most part these are used for the purpose of getting shots at the larger beasts of prey, whose habits are strictly nocturnal, their days being passed in dense bush where it is

* *Wild Life in the Australian Bush*, by Arthur Nichols, Vol. ii, pp. 77—78.

impossible to find them. It is therefore only in a very wild district, where they are rarely or never shot at, that these creatures depart from their usual ways and venture to prowl about the open country during daylight. Consequently the only way in which a hunter can get shots at them is by watching for them by night, a plan which is rarely attended with much success, except at watering-places which these animals resort to, both in search of prey and of drink, after nightfall. To render sitting up for them worth attempting, it is necessary that the country should be as nearly as possible waterless, except at a few widely separated points, where all the game throughout a wide area of surrounding country must perforce go to drink.

At such spots both birds and beasts, often in very great numbers, come to quench their thirst at the waters as soon as the sun has set. Flights of sand grouse, pigeons, doves, and many other sorts of fowl may be seen winging their way towards them, shortly before sundown. The traveller will of course carefully note the direction in which they proceed, and observe whether they fly in parallel courses merely, or whether they *converge* towards a certain point; in the former case it is probable that they are on the way to some stream or river, along whose bed water holes exist at intervals; in the latter it is almost certain they are making for some desert pool or spring, located at some one solitary point in the wilderness. This latter spot in preference to all others is the place for sitting out in a shooting hole, by night, in order to kill lions and other beasts of prey, and also heavy game animals of all sorts. Some instances of the marvellous displays of splendid beasts of all sorts that have been sometimes

seen at these places, have been already described in another part of this work; these accounts are all taken from the writings of various celebrated hunters and travellers, whose names are given in each case.* It will therefore be needless to cite futher instances here. Mr. Charles J. Andersen, the well-known Swedish naturalist and explorer however, specially mentions that in his opinion there is no way in which these wild scenes of natural zoological displays can be witnessed in such wonderful perfection, as in night-shooting at a desert pool:

"During my peregrinations in South Africa (he says) I have seen something of every sort of sport, whether at night, by the side of the mirrored water or the salt lake, or by day on foot, or on horseback; and I most conscientiously declare that in my opinion a moonlight ambush by a pool, well frequented by wild animals, is worth all the other modes of enjoying a gun put together." †

It will doubtless be understood that Mr. Andersen speaks from the point of view of a naturalist and student of Nature, and not by any means, as we believe, as the mere slaughterer of large numbers of beautiful and valuable animals; for he goes on to say: "I have certainly learnt more of the untamed life of savage beasts in a single night's tableau-vivant, than during months of toilsome wanderings in the broad light of the sun." §

This could only be done by watching their proceedings, without firing at them as soon as they arrived, and thus being able to study at leisure the

* See our chapter xvi on "Great Herds of Game."

† *The Okavango River: a Narrative of Exploration*, by Charles John Andersen, 1856, p. 85.

§ *Ibid.*, p. 86.

habits of wild game, as they stood in fancied security, at home, in their own haunts, drinking their fill beside the life-giving waters. One could at such times learn more of their ways than by hunting or seeing them afar off in the plain or forest, by day, much as one sees more of the individual man at his own dinner table, and by his own fireside of an evening, than one does of him in the busy haunts of commerce or of dissipation, surrounded by the whirl of city life.

Now, no one had a better opportunity of speaking with authority on such matters than Mr. C. J. Andersen, who passed twenty-five years of his life wandering through the great South African wilderness. His was a truly wonderful career, in the various capacities of traveller, explorer, naturalist, and hunter, and with his almost unexampled experience and great knowledge of wild beasts and their ways, we think anything he may have said on such a subject may be very safely received as coming from a leading authority.

We mention this with some minuteness of detail because in the works of more than one hunter of reputation, a different view is taken of this matter of night-shooting, which is held to be at best but a wearisome and by no means very successful means of killing game. We are however quite aware that like everything else it has its drawbacks, and that it can only be followed on special occasions with any considerable amount of success.

For instance, there should be good moonlight, otherwise it becomes almost impossible to distinguish the forms of animals against the dark background of bush, which in general surrounds such spots; for be it remembered that wherever there is water, there bush will in

general be found too, unless the water is drawn from a deep well, and above all unless the arborescent vegetation is destroyed by bush-feeding animals—among which we may mention the camel and the goat as two of perhaps the very worst destroyers of natural bush; indeed we believe a very strong case might be made which would go far to prove that the constantly increasing extent of treeless deserts in many parts of the world is due to the destruction of all tree-life by these and other tree-feeding creatures. That however is beyond the scope of our present subject. We are however free to admit that night-shooting is necessarily a very uncertain sport, as many animals fired at are merely wounded, and finally effect their escape altogether. That however is a matter which cannot be helped. All the advice we can give our readers on the subject is—Always *fire low*, ridiculously low; because at night a man, in trying to get a clear sight of his gun on an animal, is sure to fire high in doing so, unless he purposely aims apparently much too low; this we can say, as we have fired many shots, under all sorts of conditions, at night. Various were the dodges that were tried in former days, to try and see the sights of guns on game during darkness; such as bands of white paper tied round the muzzle, and other such plans; probably now-a-days better could be done by luminous compositions then unknown, * but personally we have no experience of such matters in the field,

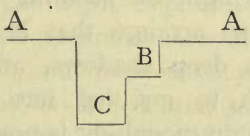
* Luminous paint has been suggested for this purpose by the late Sir Samuel Baker in his last book, published shortly before his death. "Nothing is so effective," he thinks, "and it can be purchased in stoppered bottles and will last for years. A small supply will be very useful in an outfit" (*Wild Beasts and Their Ways*, by Sir Samuel W. Baker, 1891, Vol. i., p. 154).

though we are well aware that the subject has formed a regular branch of study among military experts, with a view to their use during night attacks in war; which will probably, for several reasons, form a leading feature in the next great war. But this again is another technical matter beyond the scope of our present subject.

Time and space oblige us to confine our remarks upon it within as narrow limits as we can. One of the reasons however, which makes it so hard to ascertain what the effect of one's shot is, on dark nights, is because the brilliant flash of his own gun dazzles the hunter for a time, and thus prevents his seeing what the effect of the shot has been; for even during bright moonlight, if an animal is standing in the shade against a dark background, it is not always easy to see clearly what occurs, and before one's eyes again become accustomed to the dim light, the startled game has rushed off and become enveloped in the surrounding darkness, unless indeed it has at once fallen to the shot. For this reason it is always better to shoot by night from a rifle-pit or "shooting hole," as hunters call it, rather than from a tree, though the latter is no doubt the safest of the two in the case of dangerous animals being about—because there is a better chance of getting a good view of the outline of the game from the ground level, than if perched up above it and obliged to fire down in the shades beneath.

Then the stand must be carefully chosen, so as to be as far as possible in such a position that the game cannot take the wind of the hunter: not by any means an easy matter at all times; the hunter will however of course have duly made a careful reconnaissance

of the whole surrounding locality during daylight, and decided in his own mind, by an examination of the trails leading down to the water, from what side it is most probable that game will approach. He must then make the best arrangements he can, accordingly. Should the ground admit of it, he may take his stand without any hole, among rocks, bushes, long grass, or other cover sufficient to conceal him from the view of game; or, if there is no cover of any kind he may make an artificial screen for the same purpose, though this we fear is at best but a clumsy makeshift. Finally he may dig a hole sufficiently large and deep to effectually conceal himself. One of the various forms of military rifle-pits, for use by a single man, is probably the best and easiest made of any other; for this purpose—the one we would suggest as one of the most convenient being thus shaped



the ground level being at *A*, the seat at *B*, and the feet being down in the hole at *C*. Only the head should appear above the ground, and the crest of the ground-line makes a good rest for the rifle. The stuff taken out of the hole may be utilized to form part of the side-walls, and should be so arranged as not to be visible from a distance, its freshly turned appearance being masked with dead leaves, grass, or other natural objects that go well with the surrounding landscape.

All work necessary for these purposes should be

done as long as possible before the time when it is intended to occupy the hole, and then just before sundown, or at least very soon after, on the night that he purposes to sit up, the sportsman should take up his position in it, bringing with him a mackintosh, or something to secure a dry seat, and a blanket or other wrap to keep the dew (if there is any) off himself and his guns;* this together with a flask and some eatables will complete his impedimenta.

Guns that carry a heavy ball are the best for this sort of service, and a spare weapon or two is always a useful stand-by, when they can be taken.

A clear, fairly light night, is on the whole perhaps the best for this sort of sport, and not always bright moonlight; the shadows are then too intense, and when the moonbeams light up the surroundings things are too clearly seen, and moreover they make an uncertain kind of light for shooting in, so that unless the hunter can so arrange that he shall himself be concealed in the deep shadows, and that the game are kind enough to get out into the brilliantly lit portions, very bright moonlight is not desirable: merely a sufficiency of light to see what is going on fairly clearly. A good binocular field glass with large lenses and low power is a most useful aid in making out the nature of the dimly seen objects, and we may state that in South Africa, during the dewless nights of which we have spoken, we recently conducted a regular series of experiments with such glasses, with a view to noting results for our literary work. Numerous objects were thus examined, and we can say that

* In the South African wilderness, from December to March, there is often no dew.

such glasses are a great help in making out indistinct forms seen by the eye looming through the darkness. The most profound quiet must of course be observed; the hunter should remain as far as possible perfectly motionless, as in the deathlike stillness of the desert nights the slightest sound of rustling or movement of any kind is distinctly audible a long way off by sharp-eared beasts; and unless it is quite dark anything moving is at once seen also. It has been observed by Andersen, Chapman, and other experienced hunters, that the first to arrive at the water are always the smaller and less wary birds and animals, whereas the heavy game visit it much later on in the night.

The sound of shots may however prevent anything more arriving, at all events for a considerable time afterwards; but sometimes night-shooting is extraordinarily successful. Mr. James Chapman for example, mentions having got eight elephants on a single night in this way. Such successes are however of course altogether unusual, and more often not more than one or two beasts may be killed, and sometimes none at all. We may here just mention that great care should be taken to prevent accidents in shooting men instead of game. Thus the late Mr. St. John, among others, relates how two men were killed (one instantly, the other being mortally wounded) by a companion, while watching for deer that were destroying a corn-field in Scotland.* Colonel Hawker also mentions quite a number of shooting accidents, occurring to persons out with punt guns at night, in consequence of people mistaking the

* See *Wild Sports and Natural History in the Scottish Highlands*, by Charles St. John, new edit. 1880, pp. 30 and 31. (Originally published 1846).

canoe and sportsman for a flight of duck, floating on the water; * so does his more modern colleague Mr. Folkard, in his work on Wildfowling. † A similar case of a fatal accident quite recently came under our own notice while in Australia, one man shooting a comrade dead, who was fishing upon the river bank, through mistaking his head for a duck; full details of this accident appeared in all the Australian papers at the time. §

We mention these matters, as accidents might occur through companions imprudently going to see "how their friend was getting on in his hole," and so getting taken for wild animals. Mr. Gordon Cumming for instance, among others, distinguished himself at the outset of his career as an African hunter, by shooting the horses of a Boer settler, in the dark mistaking them for some quaggas he had been in chase of. **

Before closing the subject of night-shooting we ought to say a few words upon the East Indian practice of shooting from a platform, usually constructed in a tree (known in India as "machán"), generally either "at a tie" over a live bullock or other animal, tied up as a bait; or else over a "kill" or bullock already killed and partially devoured by a tiger. Full descriptions of this sort of sport may be found in most of the leading works on Indian shooting. "For a man to expose himself to a savage, night-seeing animal" (on the ground) "when his own vision fails, is fool-

* *Instructions to Sportsmen*, by Colonel Peter Hawker, originally published 1816.

† *Wildfowling*, by H. C. Folkard, 1875.

§ See *The Sydney Morning Herald*, of March 25, 1895, and other papers of same and following days.

** *Five Years of a Hunter's Life in South Africa* (1843—1848), by Mr. Gordon Cumming of Altyre, 1850, Vol. i., pp. 80 and 81.

hardiness," says Mr. Sterndale. He also adds, "We must raise our voice against sitting in a pit over water, at any time of the year" (in India). "We speak from experience, having suffered from its evil effects." *

In malarious jungles and districts there is no doubt of the wisdom of this advice; but in dry plains, in regions such as we have lately been referring to, there is very little malaria, and the risk from fever is very much less. Being raised in a tree, fifteen or twenty feet above the ground, of course renders the risk of taking fever somewhat less in an Indian jungle, but the great probabilities are that the whole surrounding country in such districts is more or less malarious, even during the driest seasons. A great deal of this sort of shooting is therefore done by native shikaris, when it becomes a necessity to destroy a destructive beast, as these men are not subject to fever in the same degree as Europeans; they can therefore sit up all night with probable impunity; whereas the advice given by Major Shakespear to European sportsmen, as to night-shooting in India, is as follows: "Leave camp before day-break, and sit still 8 o'clock and no longer; go again in the afternoon, an hour and a half before sunset, and do not remain more than an hour after sunset." †

As regards the construction of machán, it may be stated on the high authority of Mr. Sanderson that the platform should be six feet long by three broad, constructed with its length towards the "kill." It should if possible be fifteen or twenty feet above the ground,

* *Seonee, or Camp Life on the Satpura Range* (of Central India), by Robert A. Sterndale, F.R.G.S., 1877, p. 152.

† *The Wild Sports of India*, by Major Henry Shakespear, Nagpoor Irregular Cavalry, London 1862.

to lessen the chance of a tiger winding the sportsmen; also, a tiger rarely looks up, unless his attention is attracted by some sound. The platform should be screened with leafy branches of a kind whose leaves will not dry up quickly, nor rustle when touched; and a hole six inches square must be left in front to fire through. There should of course be good moonlight, as nothing can be done during dark nights. But in Mr. Sanderson's opinion there is no way of shooting tigers so seldom successful, as watching for their return to an animal they have killed. Nevertheless if a man is unable to organize a big beat with elephants and native beaters, it may be his only chance of getting a shot.

The first indication of the tiger's approach, when he does come however, is hearing the bullock start or make some uneasy movement, at a "tie"; while jackals and other small animals give notice of it at a "kill." The sharp chirping of squirrels and birds also sometimes indicates that a tiger is at hand; * and above all, the "swearing" of monkeys, and the screams of peacocks and other birds, during a beat.

As little noise as possible should of course be made in putting up the platforms; for this reason therefore it is better to have the wood used in their construction cut and prepared at a distance, and carried quietly to the required spot. Sir Samuel Baker mentions that he prefers triangular platforms formed of three thick pieces, with fifteen or twenty cross-bars, and advises that they should be made large, firm, and roomy, so as to be steady in a wind. † He considers a scaffolding, with

* *Thirteen Years among the Wild Beasts of India*, by G.P. Sanderson, 2nd edit., 1879.

† *Wild Beasts and Their Ways*, by Sir Samuel W. Baker, 1891, Vol. i, pp. 168—9.

the platform raised about ten feet from the ground, the best form of machán, as he does not think a tree a favourable stand for shooting. * Indeed in all his African travels, we do not remember his mentioning a single instance of his having waited for game in a tree, or attempted night-shooting otherwise than in a shooting pit or hole, in the way we have already described. The machán is therefore a method of shooting peculiarly East Indian, and there can be no doubt that these platforms (either on scaffolds or in trees) so frequently used in Hindustan, take their origin from the very ancient practice of native watchers sitting up by night to guard their fields, and to prevent the destruction of their crops by wild animals. For this purpose they made rude platforms upon which the watchers perched themselves, for reasons of personal security. This practice has been in vogue from very remote times, both in Africa and throughout the East, and therefore attracts very little attention from wild animals, where they are in general use. Shepherds on the other hand mostly drove their flocks into some sort of enclosure, surrounded by thorn bushes, † or in treeless or thickly settled neighbourhoods by rough walls of loose stones; this is known as the "Kraal" system in South Africa, and it has been in use there long antecedent to historic times. In all probability at the era of the "Nativity" at Bethlehem, recorded in the New Testament, it was at just such places that shepherds were found "abiding in the field, keeping

* *Wild Beasts and Their Ways*, by Sir Samuel W. Baker, 1891, Vol. i., p. 153.

† These thorn enclosures are called "Zarebas" among the Arab tribes of Northern and Central Africa.

watch upon their flock by night;" * and from the nature of the country, which is treeless and stony, the chances are that the enclosures upon the plains of Palestine consisted of loose stone walls, such as we have spoken of above. Moreover the Scriptural allusions to sheep *following* the shepherd are strictly in accordance with actual practice. The shepherd, who is well known to and constantly with his sheep, walks in front and the sheep meekly follow after. We have noticed such incidents again and again during our own oriental experiences.

There is another sort of "blind" that is at times very useful in antelope shooting on wide plains, often made use of in the great game country of South Africa by the Dutch Boers in former days. These consist of small circular enclosures † just large enough for one sportsman to crouch behind, at some game pass among the hills, by which the game are in the constant habit of passing to and fro. Here the hunter awaits their coming, or else sends a comrade on horseback round to start a herd feeding in the open, in which case they commonly make for the pass. It is to be observed that experience shows that game started in this way almost always run to windward. We can have no doubt that this is to enable them to catch the scent of enemies that may possibly be lurking in that direction. Similar blinds were in use among the Red Indian tribes of North America inhabiting the Rocky Mountains and other hill countries; they used in the same way to have them in passes, and on the tops of divides, where the animals were in the habit of cross-

* *St. Luke* ii., v. 8.

† Called "Scherms" in Afrikander Dutch.

ing, and they were very successful in killing wild sheep and other game from their shelter.

Such enclosures should be some six feet in diameter, and the walls may be some thirty inches or three feet high; to get better cover, the floor may be sunk a little, giving a hole for the feet to go into, the sportsman sitting on the ground level. The blinds used in grouse-driving at home are good forms of this sort of thing, but they are especially prepared for sportsmen to shoot from while standing.

We must end this chapter with a short reference to mountain shooting. "The grand rule in all hill stalking" (says Colonel Kinlock, one of the latest and best authorities on these matters) "is to keep well above the herd, whose vigilance is chiefly directed beneath them." * It seems to be a pretty general practice of all animals to survey the landscape *below* them, without paying much attention to the higher hills which rise above them, unless some circumstance occurs to arouse their suspicions of an enemy overlooking them. To enable them the more effectually to look down upon the world beneath, most hill creatures for this reason make at once for the highest grounds the moment they become alarmed. That being so, it is of course desirable for the hunter to keep well up towards the hill tops, from whence he also can get a good survey of everything beneath him. There he is less likely to be observed or scented by game, unless indeed he is thoughtless enough to show himself against the sky-line, in coming over a divide. Moreover, after the first climb among hills where the tops are not cut off from the

* *Large Game Shooting in Thibet and the Himalayas*, by Colonel Kinlock, King's Royal Rifle Corps, Calcutta 1885, p. 146.

slopes by precipices, a man can thus save himself much fatigue in walking, as he is able to move along the higher slopes with greater ease, than if he had to be continually ascending and descending, to keep right with the wind and to avoid obstacles, which he would probably have to do if he kept upon the lower slopes. There can be little doubt also that when the wind is steady, the scent of a man on a high eminence is carried away into space, far above the heads of game lying a considerable distance down-hill; should the hunter come upon game seen to leeward of him, he will see this for himself from the top of a high ridge, for in general, if the wind is steady they will not catch scent of him. Nevertheless it will not do to presume too much upon this, especially if the wind blows in gusts, as an eddy may carry scent downwards; but wind as we venture to think, most commonly flows along pretty evenly and floats much upon a level, seldom making great ups and dows, unless deflected by some local cause. The drift of smoke through the air shows this pretty clearly; at the same time very little is really known about the phenomena of air currents. Smoke tends to become dispersed as it floats along, but it is only its heavier particles that sink earthwards. Were this otherwise, the streets of every town would be filled with smoke. What we believe is that the invisible scent carried by the breeze is carried along in a very similar manner to smoke.

"But (says Mr. Macrae, a Highland forester of great experience with deer) the difference between a moderate breeze and a strong wind cannot be well understood by people having little knowledge of these things; and it is a fact that a strong wind carries scent beyond the limit to which a

moderate breeze can; the reason seems to be that a moderate breeze travelling slowly, permits the scent to become diffused through the atmosphere, and the tainted air to become purified before reaching the herd; while a strong wind, moving with great speed, carries the scent over the same space in too short a time to allow its influence to be diminished." *

This is very much our own opinion. Mr. Macrae is also a very strong advocate for stalking from above, and not up-hill; long experience having taught him that the advantages are "on the whole greater when above, than below deer." † The wild black-tailed deer of America, and mountain sheep and goats of all kinds, for instance, almost always post themselves high up upon the mountains, at the base of some precipitous slope among rocks and other cover, that makes it very hard to distinguish them. From such a point they take care to have a perfect view over everything that passes below, while anything that approaches from above is detected by the loose fragments of stone started by the feet of the hunter, which come rolling down the slope and so give the alarm.

Should animals be discovered in such positions therefore, it often necessitates a wide detour being made to leeward, in order to be able to approach with any chance of success. According to Colonel Dodge the only plan likely to prove effective in difficult cases, is to send another man round to windward, who is to approach cautiously as soon as the sportsman has got into a good position; and the

* *A Handbook of Deer-Stalking*, by Alexander Macrae, late Forester to Lord Henry Bentinck, 1880, pp. 28 and 29.

† *Ibid.*, p. 45.

deer or other game, on scenting him, move off down the wind upon the hunter who is waiting for them.* American Indians and other hardy hunters often obtain good success by passing the night on the mountain tops, during summer, and watching the edges of bushy tracts at daybreak, where they know the mountain game are apt to go to feed soon after dawn; at which hour game is generally less suspicious and more easily approached than at any other time.

The advantages of this course are well summarized in the Handbook of Big Game Shooting of the Badminton Library:

"By sleeping at the top of your ground, or near it (says the Editor) you avoid the necessity of rising at midnight; you are sure of being at your look-out station in time; you can examine several faces of the range at once, and choose that upon which you see game in the most approachable position; you begin your day's work fairly fresh, instead of being dead-beat by a stiff climb before dawn; and you get a chance of stalking your game from the only point from which it can be stalked, with any reasonable hope of success." †

It is also pointed out by the same authority that the man who adopts this plan need not necessarily undergo severe hardships from the intensity of the cold: furs or waterproofs, over good wraps, affording very complete protection, always used by hunters in North America during the winter months. The editor of Big Game Shooting advises a sleeping bag,

* *The Hunting Grounds of the Great West*, by Colonel Richard I. Dodge, U.S.A., 1877, p. 177.

† *Big Game Shooting*. Badminton Library. Edited by C. Phillipps Wolley, 1894, Vol. ii., p. 58. (Chapter on the "Mountain Game of the Caucasus.")

presumably of the arctic pattern; and a bag of this description of heavy wool, closely felted, known as the "Kenwood Camp and Sleeping Bag," is advertized for sale in the American sporting paper *Forest and Stream*. We must however warn the reader (as we know nothing of this invention) that unless the exterior is of skin or mackintosh, the cold will penetrate through woollen coverings of very great thickness. Another form of sleeping bag is fully described in Mr. Galton's "Art of Travel," as in use among the French *Douaniers*, which seems just the thing for a sportsman shooting upon lofty mountains, as for instance in Thibet.* Captain Hamilton Bowers, among others, expressly mentions that during his travels in Thibet he found "blankets alone are of little use against great cold, and no amount of woollen clothes will keep out the wind." † Sheepskin robes are therefore a necessity, and admirable clothing of this description is offered for sale by native dealers all over Northern India, both for day and night use; the long coats are called in the native vernacular "postheen," and afford excellent protection against cold.

It is not at all uncommon among great mountains to find hollow recesses among large masses of fallen rock, sufficiently large to shelter several men from the bitter night winds; and if such a spot can be found it is quite possible to pass the night there in comparative comfort; frequently a fire can be kindled in it, and such a place may afford an admirable point of vantage to issue from at these early hours. We speak of this

* See *The Art of Travel*, by Francis Galton.

† *Diary of a Journey Across Thibet*, by Captain Hamilton Bower, 17th Bengal Cavalry, 1894, p. 3.

latter point, from personal experience of its advantages. Nearly all the varieties of mountain sheep and goats live at such elevations that they always keep in a cool atmosphere. How these animals live during the intense cold, when the deep snows of winter on lofty ranges cover all herbage, is often a complete mystery. In Thibet for instance, the most recent accounts state that the "Ovis Ammon" is not found below an elevation of 15,000 feet; * while the Thibetan antelope (*Pantholops Hodgsonii*) and gazelle (*Gazella Picticandata*) are mostly found at elevations of from 16,000 to 18,500 feet. †

There appears from these accounts to be an immense quantity of game on this mighty table-land, and on the slopes of the barren hills that rise out of it, which form the greater part of this extraordinary region of Thibet, nearly all of which lies at the enormous elevation of above 15,000 feet over sea-level. § For example, the following passage gives an idea of the quantity of game seen:

"In every direction (says Captain Bower) antelope and yak in incredible numbers were seen, some grazing, some lying down. No trees, no signs of man; and this peaceful lake (close to where he was encamped) never before seen by a European eye, is seemingly given over to the wild animals—a sportsman's paradise." **

The surprising numbers of game animals which inhabit some of the most barren and apparently inhospitable regions of the earth, is a circumstance which

* *Diary of a Journey Across Thibet*, by Captain Hamilton Bower, 17th Bengal Cavalry, 1894, p. 288.

† *Ibid.*, pp. 286—88.

§ See *Ibid.*, Minimum Temperature Chart, and Table of Recorded Elevations, at the end of the volume (by Dr. Thorold, I.M.S.).

** *Ibid.*, p. 35 (near Aru, Camp 12, 17,176 feet over sea-level).

has been already discussed in some detail. Mr. Darwin first drew attention to it, with reference to the dry sandy wastes of South Africa; and it is not a little remarkable to find the same thing recurring in a region of arctic cold, such as Thibet. The climate of the latter, it must be observed, though one of intense cold, is also exceedingly dry. Indeed "wherever these extremes of heat and cold occur, the air is always and of necessity extremely dry." * We have also already pointed out the remarkable similarity between many of the circumstances which accompany great dry heat, and great dry cold; and it is again to be noted in this occurrence of great herds of game in exceedingly dry and barren plains, in one case (as in Africa) where the solar heats are intense, and in another (as upon the lofty table-lands of Thibet) where the piercing nature of the cold is no less equally intense. Yet in both these cases, the game assemble in these inhospitable wastes in extraordinary numbers, though it would apparently seem that the means of subsistence are by no means adequate to the maintenance of such a numerous stock of grazing animals.

Thus Captain Hamilton Bower, speaking of the great game herds of the Thibetan table-lands, expresses his unfeigned surprise at their being able to obtain the means of existence in these exceedingly barren plains, and says,

"The grasses, of which 23 species were collected, must be extremely nourishing, as travelling across the plateaux, the enormous herds of yak and antelope to be seen appear quite disproportionate to the amount of grass to support

* See *Heat a Mode of Motion*, by Professor J. Tyndall, 5th edit. 1875, pp. 352—53.

them produced by the country. How these animals live through the arctic cold of the long winter, when the country is covered with snow, hiding the little withered grass that remains, appears a mystery." *

Further accounts by other witnesses, respecting the mighty herds of game seen in Thibet, had already been furnished by the Pundit Nain Singh, and others. In one of these cases the plateau was seen covered "with countless herds of antelope," one of which "over 2000 in number" is described as resembling "a regiment of soldiers, with their horns glistening in the sun like bayonets." † So also Dr. (now Sir) Joseph Hooker, in his "Himalayan Journals," describing the magnificence of the scenery, and the quantity of game seen near Lake Cholamo, 17,000 feet above sea-level, mentions that "the abundance of animal life was wonderful," and that "large antelopes and deer, and many slate-coloured hares" were seen feeding on some short grass near the lake, on whose surface a flock of common English teal were swimming, while an enormous quantity of wildfowl of many descriptions make their nesting grounds in these great Thibetan wilds." §

These facts therefore are well attested; and certainly these assemblages of great herds of game animals, in what all descriptions concur in representing as being, as a rule, singularly barren stony wastes, is a most

* *Journey Across Thibet*, by Captain Hamilton Bower, 17th Bengal Cavalry, 1894, p. 285.

† See Account of the Pundit Nain Singh's Journey in Great Thibet, in a paper read by Captain H. Trotter, R.E., before the R.G.S., in *Journal of the Royal Geographical Society*, Vol. xlvii, pp. 104—5.

§ See *Himalayan Journals*, by Sir Joseph D. Hooker, 1834, Vol. ii., pp. 164—175.

remarkable fact in natural history: though of course as at Lake Cholamo, the occurrence of stretches of short grass forms occasional exceptions to the prevailing scarcity of vegetation.

The amount of botanical research however, which it has as yet been possible to make in a country so very little known, and which still remains closed against the entrance of travellers, furnishes very little idea of the possible capabilities of its flora; our knowledge of such matters in Thibet being of the very smallest. We would however venture to suggest that upon bare rocks of great altitudes there may exist large quantities of nutritive lichens, mosses, and other rock-growing plants, which it is just possible may assist in solving this interesting question of how these large numbers of animals exist. Should these plants be found to exist, they would furnish food to game throughout the longest and severest winters, at the highest altitudes, the fierce winds keeping these places to a great extent swept clear of snow, and these plants thrive best in the most exposed places.

We shall only call attention to one such form of food, which in Lapland, Spitzbergen, and other far northern regions supplies a vast quantity of nutritious food to large animals like the reindeer—we refer to the reindeer moss (*Cladonia Rangiferina*) upon which these animals live and flourish; in fact reindeer though they may exist in good condition upon grass for a time, will only thrive where this moss is. Then there are saxifrages and other plants, which live among eternal snows in polar climates, and there form the sustenance of the arctic game, such as hares, ptarmigan, etc. The probabilities are, as we humbly venture to believe, that among the Thibetan

wilderness of gravel, stones, and rock, a diligent search will probably some day reveal the existence of such plants there; and this would to our mind to a great extent explain how the game of this remarkable table-land manage to maintain existence during the long and terribly severe winters. We know already for instance, that on account of the extreme dryness of the Thibetan climate as a rule very little snow falls there, compared with what falls on the southern face of the Himalayan chain.

This therefore disposes of any difficulty as to animals being able to reach such food, should it exist. These plants themselves generally grow in their very best condition upon wind-blown surfaces of bare rock, throughout the northern polar region, probably up to the very pole itself wherever there is land. Some details will be found respecting them in our chapter on the Arctic Zone, to which we beg to refer our readers.

The peculiarities of life at great elevations, both for man and beast, present numerous special features of interest, some of which must necessarily be made the subject of consideration, in any account however brief of mountain shooting, as the finest sport is only to be had in the barren grounds high above the habitations of man, where the rarefication of the atmosphere imposes conditions upon our bodily frames which must by no means be overlooked; its pressure representing, as we all know something like 14.7 lbs upon the square inch, at sea-level, diminishes with great rapidity at increased altitudes; so much so that it is extremely doubtful whether the attenuated air upon the tops of our very highest mountains (such for instance as Mount Everest, 29,000 feet) would suffice—could we get

there—to maintain human life at all for more than a very short period of time. * At even half that height above the sea (say 14,500 feet) however, any form of exertion becomes exceedingly laborious, and the sensation of "want of breath" proves quite distressing after very slight exercise; indeed it is doubtful if human beings could reside at such an altitude, for a permanency, as at these heights, on the table-lands and passes of the Andes, as we have before observed, there is a regular disease, to which all dwellers on the plains are subject, known in Spanish as "Puña," which in its severer forms not unfrequently proves fatal. † We have ourselves suffered severely from it. It is the result of exertion undergone in highly rarefied atmosphere, which is always felt with peculiar intensity among persons lately arrived from the low-lands. Its effects however diminish, though they never disappear, after such persons have resided for some time at great altitudes.

The lungs on such occasions appear to be incapable of filling themselves properly with air, and the efforts made to catch breath after exertion become exceedingly laboured, and produce a sensation akin to that of suffocation: while the working of the heart itself when climbing up steep slopes, at great altitudes, may frequently be actually heard—its action is also accelerated to a high degree, and a great strain is placed upon it.

* See account of the deaths of Messrs. Croci-Spinelli and Sivel, suffocated in a balloon, April 15, 1875, at an elevation of from 26,000 to 28,000 feet by want of air (London *Times* of April 19, 1875; contains complete details, given on p. 7).

† See observations on "Mountain Sickness" in the Himalayas, in the *Himalayan Journals* of Sir J. D. Hooker, 1854, Vol. ii., p. 150; also on "Puña," in his *Travels among the Great Andes*, by Edward Whymper, 1892, pp. 382 to 384, same at pp. 367 to 370.

Hence it becomes expedient for lowlanders who visit great mountain regions and travel over their elevated table-lands, to exercise considerable judgment in the amount of exertion they impose upom themselves, either in climbing or hunting after game. Even at comparatively trifling altitudes like those of the Scotch mountains, care has to be exercised in this respect, and we commend the wise advice given by Mr. Grimble in his book upon Highland deer-stalking, to the attention of our readers:

"The great thing in going up a long steep hill (he suggests) is to stop, and admire the view, the moment nature warns that too great a strain is being placed on the pumping powers of the heart. Many a good man, out of condition, has seriously injured that organ by trying to 'live' with a practised walker up a severe hill." *

This being so at these very minor elevations, the reader may guess how much greater is the necessity for precaution at the great altitudes met with in regions like those of the Himalayas or the Andes, where the boiling point of water becomes so diminished that it is possible to put the finger into it without being scalded; and where every kind of food in consequence takes quite double the time to cook that it does in the lowlands. Moreover even one's very gun becomes largely affected in its shooting power; the same elevations of the sights used in shooting down in the plains, give quite different results high up upon lofty mountains. Hence new-comers find they frequently miss the fairest shots. We cannot doubt that this is largely due to the diminished pressure met with by the bullets in their transit through space; but also, we

* *Deer-Stalking*, by Augustus Grimble, 1886, p. 23.

are inclined to think, because for the same reason the whole of the powder charge is not consumed in the barrel, but is blown out either unburnt, or else it burns in the air, after it has left the muzzle. The advantage of long barrels therefore is generally very marked in mountain shooting. There is also the rugged nature of the ground to be taken into account, which likewise has its effect, and makes it exceedingly difficult for an eye unaccustomed to hill-shooting, to determine what the ranges are when firing at game a certain distance away. These effects are most keenly felt when firing up or down steep declivities, or across broken ground and streams, where a portion of the intervening space is hidden from view. The gigantic size of cliffs and other natural objects in the immediate vicinity, as well as the peculiarities of the atmosphere, all combine to increase the difficulty of the new-comer in estimating the correct distance that a small object like an animal is away from him. We believe the only way to overcome these difficulties is to practice occasional shots at marks, and afterwards ascertain what the correct range was; this is the course recommended by Mr. Macrae in his handbook on deer-stalking, and it seems the common-sense course to take. Without practice at marks few men make good rifle-shots; and yet as we have already insisted, such practice alone will not make men good game shots; both species of practice, at marks and at game, are essential to make a good rifleman.

The great thing in rifle-shooting is to acquire a sound acquaintance with the exact powers of the weapon in all its details, and thus make the most of experience gained. General Crealock therefore, who was himself

an experienced stalker, strongly advises his readers to satisfy themselves as to what the causes of missed shots are:

"Measure the distance (he says) and see if you took your range right; think out what the mistake was, and how you could have avoided the disaster. Every shot thought out intelligently is an experience; for this reason I never take a shot, hit or miss, without measuring the distance afterwards. I hold that nothing helps to form your judgment so much." *

This is undoubtedly wise advice, which should be followed whenever circumstances admit of it. The general is also very emphatic in explaining the deceptive character of apparent distances upon lofty mountains; and alluding to his Indian experiences states that—"In the clear atmosphere of the Kashmir everything looks nearer than it is, and if you measure your shot you will soon find you were 60 or 100 yards out in your calculation;" the tendency of inexperienced persons being to greatly underestimate ranges under such circumstances.

The successful stalking of wild game upon the higher slopes of a great mountain range has always appeared to us to be one of the best tests of a man's real worth as a sportsman. It requires him to be sound both of wind and limb, to have a thorough acquaintance with the natural habits etc. of the different kinds of game, and at the same time to be ever watchful and circumspect in his own movements, as well as prompt in coming to a correct judgment as to the best method of out-manoeuvring these wary, sharp-nosed and keen-sighted creatures. He must be ready to put up with

* *Deer-Stalking in the Scottish Highlands*, by Lieut.-General Crealock, 1892, p. 185.

hard fare and hard work, and possess an inexhaustible fund of patience and endurance.

On the other hand, his favourite pastime will frequently introduce him to scenery of unsurpassed grandeur and magnificence, such as we have feebly endeavoured to portray in our chapter on Great Mountain Ranges; while the bracing atmosphere and constant exercise obtained during a mountain tour in general unquestionably serve to develop the physical powers to a high degree; and if a man in robust health and condition does not in general descend to the plains improved both in mind and body by his mountaineering experience, why it will probably be his own fault rather than that of his great and kindly instructress Nature, whose marvels he will have had an opportunity of contemplating.

CHAPTER XVII.

WILDFOWL AND WILDFOWL SHOOTING.

Value of Birds as Food Supplies for Travellers etc. The Term "Wildfowl" in its Extended Sense. Migratory Flights of Birds. Long Distance Migrants. Migrations of Aquatic Wildfowl. Birds and the Habitations of Man. "The Fear of Man" among Birds. Wild Duck on Inland Lochs. Storms at Sea and the Movements of Aquatic Birds. Wild Swans. Wildfowl on Preserved Waters. Their Knowledge that they are Never Shot at There. Wonderful Instances of Tameness of Wild Duck. London Birds. Nocturnal Habits of Wild Duck. A Thickly populated Country no Obstacle to the Existence of Feathered Game. Wildfowl in India and China. Cornfields and Wild Fowl. Aquatic Birds feeding by Night among the Habitations of Man. Birds which follow Cultivation and Shun the Wilderness. Depredations of Wood Pigeons. Their Wild and Watchful Nature. Birds following the Plough. Rooks and Rookeries. The Rook as an Aristocratic Bird. Birds that Live in Great Cities. The London Sparrow. The Indian Grey Crow. The Myna-Bird of India. A Talking Myna-Bird. Storks upon the Housetops. The Stork regarded as a Bird of Good Omen in Oriental Lands. Kites. Turkey Buzzards. Why Birds take up their Abode with Man. Song Birds. Dr. Livingstone upon Song Birds in Africa. The Swallow as a Songster in the Sahara. Birds on the Nile. Birds in Arab Villages. Birds of Prey and Man. Hawks and Man. Birds entering Inhabited Rooms. Birds of Prey, the Allies of the Sportsman in Wild Countries. Shooting and Sport upon Forest Lakes and Rivers. Birds of Prey as "Vermin." Mutual Destruction the Universal Law among the Animal Creation. Man as a Beast of Prey. The "Dream" of Universal Peace. Field Marshal Count Von Moltke upon. Sir Samuel Baker upon Mutual Destruction in Animated Nature. Man as the Destroyer General. The Bird sets him at Defiance. Birds of Prey following Human Settlements. How Birds of Prey Hunt. The Telescopic Sight of Vultures. Travellers watching the Sky. How far above the Horizon does the Ordinary Observation of Man Extend? Vulture Hurrying to a Carcase. Arrival of Successive Flights of these Birds. Sir Samuel Baker on Vultures Floating in the Upper Atmosphere. Mr. Darwin on the Scent of Vultures. Experiments with Condors. Experiments on the Scenting Powers of Vultures. The Flight of the Condor. Birds Floating on Motionless Pinions. Seagulls. Vultures. The Marabou Stork. The

Swoop of Vultures to their Prey as a Signal to Other Birds. The Vulture in Egyptian Mythology. Vultures at Bombay. "The Towers of Silence." Parsee Funerals. A Nesting Place of Vultures. The Daring of Hawks and other Birds of Prey. Boldness of Kites in India. Scavenger Birds as Sanitary Agents. The Kite in London in the Stuart Times. The Functions of Hawks in Nature. The Uses of Hawks as Game Preservers. Epidemics among Birds. Bird Plagues. Failure of "Fowl-rearing" Farms. Epidemics among Ground Game. Dog Distemper. Sudden Decrease in the Numbers of Certain Birds. The Extinction of Races of Terrestrial Beings. Why have all these Races passed away? Winged Game increasing with Improved Agriculture. Wilderness Birds. Woodcock and Quail in the Early Settlement of America. Wild Birds as the Friends of the Farmer. Plea for their Preservation. Vegetable Blights and Plagues. The Potato Disease. The Vine Disease. The Silver Fir Aphis. The Study of Bird Life. Bird Habitants of the Arctic Regions. The Polar Ptarmigan. The Albatross. Pelagic Sea Fowl. Sea Birds in the Antarctic Regions. The Nesting Grounds of the Albatross. Stormy Weather in the Southern Seas. The Albatross in Storms at Sea. The Flight of the Albatross. How Albatrosses soar. Albatross flying directly toward the Observer becomes Invisible. The Wild Freedom of the Sea Birds. The Solan Goose. The Hen-Harrier as a Fishing Bird. Gannets Fishing. Breeding Grounds of the Gannet. Gannets as Divers. Waders. Pelicans. Pelicans on the Suez Canal. Flamingoes. Flamingoes and Saline Waters. Insects in Concentrated Brine Solutions. The Migrations of Wildfowl. British Small Birds during Severe Winters. The Winter of 1878. Disappearance of Small Birds from the British Islands. The Migratory Spirit a Part of Bird Nature. Mortality of Bird Migrants. Sufferings of Birds in the Great Frost of Feb. 1895. Distressed Migrants at Sea. The Author's Observations of Birds at Sea. How Birds Drink in Dry Countries. Birds and Dewdrops. How Aquatic Birds Feed while Young. Sealing up of the Northern Seas by Frost. Migrations from the Polar Regions on the Approach of Winter. Is the Whole Polar Wilderness Inhabited by Birds? Fly Lines of Bird Migrants. Flights along the Courses of Great Rivers. Autumn Flights of Wildfowl along the Mississippi Valley. Flight Shooting at Dawn during the American Migrations. Great Flights of Migratory Storks and Pelicans on the Nile. "Watching the Sky." Why Travellers should be Star-Gazers. The Approach of Storms. Migratory Flights Great at Altitudes. Unseen by Man from Want of Observation. The American Passenger Pigeon. The British Wood Pigeon. Wood Pigeons' Nests. Shooting Wood Pigeons. African Pigeons. Vast Pigeon Flights in North America. A great "Pigeon Roost." Practical Extinction of the American Passenger Pigeon. American Wild Turkeys. The Wild Turkey as a Wilderness Bird. Wild Turkey Shooting. Wild Turkey Roosts. The Flight of Wild Turkeys. Grouse. Tree Grouse. Snow Grouse. Belts of Grouse according to Elevation on Mountains. Moorland Grouse. British Grouse. Capercailzie. Prairie Chickens. Wilderness Birds that shun the Society of Man. The Bittern. Herons.

Cranes. Curlew. Wild Birds and Domestic Animals. Startled Birds Frightening away other Game. Sleeping Wildfowl. Their dispersal at Night to their Feeding Grounds. Thought among the Birds. The Homing Flight of Rooks. Duck Passes. Great Flocks of Wild Duck on Inland Lakes by Day. Bird Sentinels. The Language of Wildfowl. Wildfowl on the Sea Coast at Night. Creeping up to Birds. Punt Shooting. Vigilance of Sentries. Great Flocks of Wildfowl on the British Coasts. The Closing up of the Baltic by Ice. Flocks of Wildfowl on the Baltic. The Struggle for Existence among Wild Birds. The great Wildfowl Year 1880—81 on the British Coasts. Heavy Shots with Punt Guns. The Roar of Pinions of rising Wildfowl. Colonel Peter Hawker and other Authorities on Punt Gun Shooting. Shooting by Moonlight. The Power of Scent in Wildfowl. Flight Shooting in Stormy Weather. The Fly Lines of Ducks. Wildfowl Shooting at Sea. Wildfowl on Chesapeake Bay. Canvas Backed Ducks. Wild Celery. Wild Rice and other Water Weeds as Attractions for Wild Birds. Duck Shooting at Long Point, Lake Erie. Wild Geese. Brent Geese. Sea Grass Wrack. Geese on Tidal Estuaries. Great Shots at Wild Geese. Wildfowl Artillery. Colonel Hawker's Double Gun. Wounded Geese and Ducks. "The Cripple Chase." Plumage of Dead Birds saturated with Water. How does a Bird's Plumage turn Water? The Care of Health by Wild Fowlers. Fatal Result of Chills in the Human Subject. Colonel Hawker on the Care of Health by Sportsmen. Obituary Notice of Col. Hawker.

DECIDEDLY among the very best and wholesomest food which a bountiful Nature has furnished for the sustenance of man, is that which is supplied in every wilderness country from among its feathered tribes.

The flesh of many kinds of game animals is often hard, coarse, and indigestible; it has often been remarked for instance, that the flesh of antelopes is apt to disagree with travellers, and to produce various forms of indigestion; so also with many of the deer tribe, and other wild animals; few, if any of them, can compare as a continuous diet with the carefully fed meat of domestic animals, such as good beef and mutton.

But it is otherwise with birds; of these there are

many kinds, which must always be esteemed a peculiar delicacy; and it is rare, perhaps impossible, to find a country where good birds are not to be found in the wild state. We need not go further to seek for examples of this than our own grouse, partridge, snipe, woodcock, and teal, all either indigenous or constant visitors to Great Britain. In tropical countries there is the guinea fowl, the jungle fowl, and so forth. A long list of delicately flavoured game birds might be given, each of which is highly esteemed by the lovers of good cheer, in its own particular district or country. Then again their numbers are out of all proportion greater than those of the larger game animals, and they are much more easily brought to bag by the average sportsman, than almost any kind of four-footed game. They are also found almost everywhere in the forest and on the plains; on the mountain and in the valley; upon dry grounds, and in swamps; and last but not least aquatic birds literally teem upon the lakes, pools, rivers, and other waters, and even upon the stormy ocean itself, where they ride in peaceful security bidding defiance to the power of the seas. It will thus be observed that we use the term "wildfowl" in its largest sense, and include therein every species of wild bird by land or sea. We are aware however, that the word "wildfowl" is generally used to denote only aquatic birds such as ducks and geese, and other similar species, whose home is sometimes on the sea, and sometimes on inland waters, but all of them as a rule are of a migratory habit, constantly shifting their quarters. But we see no good reason for excluding, say the swallow, the pigeon, or the woodcock from this category of wildfowl. There is no bird for in-

stance, which makes longer migratory flights than the swallow. These beautiful creatures are everywhere. We have seen them flitting in myriads within the Arctic circle, and we have seen them equally numerous on the African desert, and at the Cape of Good Hope, more than 7000 miles away in a bee line; also in India, in Australia and New Zealand. Mr. Dixon for instance, in his charming work upon the migration of birds, classes the swallow in the category of birds having an "extended" migratory flight of from 7000 to 10,000 miles; and he states that only 10 species altogether are at present known to take these enormous flights. *

If therefore "wildfowl" may be taken to mean birds of wild and migratory disposition, whose field of action is limited only by the boundaries of the terrestrial sphere—wanderers which have no home nor resting place, whose days are passed continually upon the wing, and which, free as the winds themselves, fade away and perish the moment their wild freedom is infringed; surely there can be no more typical form of real wildfowl than the migratory swallow tribe.

On the other hand the game birds commonly classed as "wildfowl" in its narrower sense (though undoubtedly all of a very restless and migratory disposition, constantly shifting their quarters in search of food), as a rule do not extend their flights to the extraordinary distances accomplished by the swallow. Their comings and goings are generally limited to making their way during winter, beyond the reach of heavy frost, which

* *The Migration of Birds—an Attempt to Reduce Avian Season-flight to Law*, by Charles Dixon, 1891, p. 57.

further to the northward seals up the waters with iron bonds, and as these again become released by the advent of spring, they forthwith return to their former haunts, once more following the opening waters to their nesting grounds in the frozen north. Moreover most of these wildfowl, as for instance various kinds of ducks, geese, swans, etc., are in general easily domesticated, and many of them will live, thrive, and reproduce their species in confinement under the fostering care of man. Their food also for the most part consists of things that can be easily supplied by man; such as the various kinds of grain, and refuse matters, as well as herbage of the fields, aquatic plants, insects, and fish; whereas that of the migratory swallow probably consists almost entirely of minute winged insects which float at various altitudes in the atmosphere, and are taken by these birds as they dart to and fro upon the wing, and it is probable that the infinite twistings and turnings observable in their flight are occasioned by their pursuit of these insects. In fact there can be no doubt that this is so.

There are some few classes of birds which shun the neighbourhood of human settlements; and like the large game animals seem to retire before the advance of the dread tyrant, man. We might instance the bittern in our own country and perhaps a few others, as types of these. * But birds, for the most part, though careful to keep a respectful distance between themselves and danger, generally seem to regard the sight and sound of human occupancy with comparative

* Among foreign birds, the wild turkey, the American passenger pigeon, the ruffled grouse, the spruce partridge, the capercailzie, the bustard, and many others.

indifference. Doubtless they are fully conscious of the power with which winged flight has endowed them, of almost instantly effecting their escape from pursuit by members of the animal creation. They therefore do not fear to tolerate the presence even of man within a certain distance. Like all animated beings, birds quickly distinguish friends, or neutrals, from possible foes. Wildfowl therefore rarely show much fear of cattle or other creatures, which have no power to hurt them.

They even appreciate how far the area of danger extends, in the case of possible enemies. Thus large flocks of ducks, and other wild fowl, will remain quietly floating on the surface of the water in full sight of man, when they know they are well out of gunshot or other harm's way. It is an interesting and instructive study upon such occasions to watch the conduct of these birds, by means of a good glass. On inland lochs, etc., vast flights of wildfowl may sometimes thus be seen assembled together in full view of houses, and of persons passing along roads etc., during periods when heavy weather prevails at sea; some may be seen quietly sleeping, whilst others swim about, and plume themselves; but in all cases, alert sentries may be observed posted upon the outskirts of the flock with heads and necks erect, intently watching for the first symptom of danger—exactly as in the case of a human army encamped in the face of the enemy.

These scenes are very common in the western wilds of Connemara, or of the Donegal coast in Ireland, as well as in every wild country where immense flocks of different kinds of waterfowl often seek refuge upon lakes throughout the day, during storms at sea. The arrival of

large flocks of these birds is therefore indicative of the approach of a stormy period, and tells us that a tempestuous sea is probably then beating upon these ironbound coasts, though the surrounding atmosphere itself may at the time be undisturbed.

Generally when the weather becomes more settled, they again take their departure to the coast; but at other times considerable companies of wild geese, and even swans, seem to become enamoured of their haven of refuge, and make it their daily home for considerable periods. The wild swan is of course now-a-days comparatively scarce; still sometimes considerable numbers may yet be occasionally seen: for instance at Bawnboy in County Cavan, Ireland, in the winter of 1890, a flock of 128 wild hooper swans were seen sitting on the ice, within 300 or 400 yards of the local clergyman's house, who states in a letter to a Dublin paper (dated Dec. 26) that he had used a telescope to make sure of accurately counting them.

"Some 10 or 12 years ago (he adds) I saw here a flock of 120, but never so many as this time. For some weeks we have had several of them about our lake, but this frost has added to their number, and on these bright moonlight nights, we hear their plaintive and musical cries. I believe they feed at night, and are now resting." *

It is a well-known fact that wildfowl will often make a regular haunt of waters close to human dwellings, where they are not shot at or otherwise disturbed. On strictly preserved ponds held sacred from the gun, even though the extent of water may be very limited,

* Letter in the *Dublin Daily Express* of Dec. 30, 1890, from the Revd. Joseph Rawlins of Templeport Rectory, Bawnboy.

large flocks of ducks, teal, widgeon, etc., will constantly remain there by day, and will even allow people to walk along near the water's edge, within easy gun-shot of them, without taking flight. Single birds feeding near the margins of the pool will on these occasions sometimes rise up with a loud "quack," but only fly as far as the centre of the pool before they alight again—thus showing how quickly these otherwise exceedingly wild and wary birds become aware of the security of these protected quarters; for these same birds on neighbouring waters which are not preserved, and where they are constantly shot at, will, during their occasional visits to them, prove exceedingly wild, and will fly up the moment a man approaches within 200 or 300 yards.

Mr. Robert Gray, a Scotch ornithological writer, mentions some very remarkable cases of this kind, quite worthy of reproduction here—

"Mr. Macdonald (he says) has informed me that he has seen hundreds of mallards on a mill dam near Moneymusk, Aberdeenshire, which were so tame as to come to the call of a miller who fed them. This man no sooner made his appearance and uttered the peculiar whistle that they were accustomed to hear, than the ducks came flying in from all parts of the pond and the surrounding marshes, and alighted within a few yards of where he stood throwing out handfuls of corn. No stranger however could ever prevail on them to approach."

Again he goes on to relate that a writer in "The Field Naturalist" (publ. London 1883, Vol. i., p. 507) states—

"that a gentleman in Forfarshire, whose property was bounded on one side by the River Esk, was accustomed to amuse

himself by laying down a quantity of grain, and watching the wild ducks regaling themselves on it. After continuing the practice some time he brought such a crowd of ducks round him, that it seemed as if the entire mallard population of that part of the country was present. With his pockets full of loose grain he went out regularly on his sporting expeditions, and returned with a brace or two of mallards, without ever firing a shot, for in their eagerness to gobble up the corn the birds waddled up to his feet, and all he had to do was to stoop down and quietly seize a victim, when it was easily transferred to his capacious pockets." *

It might perhaps be supposed by many persons that the facts here related were exaggerated; but although they constitute a very remarkable instance of tameness in wildfowl, it does not follow that they may not be strictly true. It is well known that the confidence of wild creatures of almost every sort can be won over in a wonderful way by the person who habitually feeds them. Young wild ducks, reared by hand for instance, frequently become as tame as domestic birds: and many kinds of wild birds can be made perfectly tame by daily supplying them with crumbs of bread or other food. There used to be a man in Hyde Park some few years since for example, who by feeding the sparrows, got them to know him quite well, so that they would even come and take crumbs from his hand.

As we know, in London and other large centres of population bird life is quite abundant; and many kinds of very wild birds find a secure haunt in its parks and squares and on its ornamental waters.

In all thickly populated countries at all events, aquatic

* *The Birds of the West of Scotland and the Outer Hebrides*, by Robt. Gray, 1871. (Article "The Wild Duck," p. 370).

birds are mostly night feeders, and as soon as the sun goes down, and the darkness has fallen, they fly off to their nocturnal feeding grounds and scatter themselves all over the country, visiting the fields and gardens and even when all is still, the farm yards and stack yards of farmers, in their quest of food.

A thickly-populated country is therefore evidently by no means inconsistent with the concurrent presence of large numbers of aquatic wildfowl, so long as either protected waters exist, or that there are unprotected sheets of sufficient size to enable the fowl to find a secure haven of refuge upon their broad surfaces. This is well illustrated in India and China where, notwithstanding a very dense population, the waters are at certain seasons the haunt of myriads of wildfowl. In India for instance, the surfaces of the "jheels" and tanks are often covered by enormous numbers of these birds—thus Captain Baldwin states that—

"Indians who have visited certain parts of Upper-India will bear me out, when I say that the countless thousands (of wildfowl) that visit the country in the cold season, driven south by hard weather from other latitudes, can hardly be surpassed in numbers or variety, in any part of the world. All over the country there are jheels and tanks where wildfowl congregate in dense clouds. Who can forget, when the first shot was fired, the tremendous roar caused by the wings of the rising thousands." *

So also in China, probably the most populous of all countries, but one where many extensive sheets of water exist. The innumerable companies of wildfowl

* *The Large and Small Game of Bengal and the N. West Provinces*, by Capt. J. H. Baldwin, p. 337.

are there at times something almost phenomenal. The Chen-Pim lake, an immense sheet of water above Hankow, near the river Yang-tau-Kiang, is one of these places which according to Mr. T. T. Cooper is frequented by myriads of waterfowl of the duck tribe, also great numbers of wild geese. "The noises of the flocks of geese are heard, when rising off the water, three miles off, so wonderfully numerous are they. The Chinese never attempt to interfere with them." Mr. Cooper goes on to say that on one occasion he fired a rifle at them "when up rose a perfect cloud of birds, and the noise of their wings was deafening," and he adds that they "were disturbed all night by the noise of the flocks returning." *

All these things go to show that the mere presence of a very dense population of human beings is by no means inconsistent with splendid wildfowl shooting. We use the word "wildfowl" here in its largest sense. On the contrary, it seems more than probable that the existence of extensive corn fields, and a highly cultivated country, is a positive attraction to these watchful birds, whose quick senses readily enable them to elude the approach of danger: and so long as they can find a secure haven of refuge among grass, stubble and other cover, or upon the surface of broad waters, they can always manage to feed in comparative security, either among standing crops by day, or under the cover of the darkness of night, even close to the dwellings of man. Under such circumstances wildfowl will continue to maintain themselves in such localities, year after year, in undiminished numbers. We think that we can say

* *The Pioneer of Commerce, or an Overland Journey from China towards India*, by T. T. Cooper, 1871, Vol. i.

that we have ourselves seen a considerable flock of undoubted wildfowl rise from the street of a populous Indian village, as we were traversing its deserted streets during the stillness of night, showing that wherever scattered grain and other food is to be found lying about, when the world is wrapped in slumber, these watchful and daring birds will come to it, take their fill of it, and afterwards make good their retreat in safety. The same things are constantly done by the minor beasts of prey, such as foxes, jackals, hyænas etc.; they will come right in among the houses and carry off whatever offal may be lying about; and it is not at all uncommon to hear the sharp bark of the jackal close under one's windows, quite early in the night, in some of the Indian cantonments.

There are other sorts of game birds—as for instance partridges, pigeons, quail, prairie chickens, etc., and also the rook—which follow the footsteps of man like his shadow.

It is not too much to say that wherever man cultivates the earth, that there these birds will follow him and live upon the gleanings of his harvests, and they will be found there in largely increased numbers compared with what they will be in the wild uncultivated districts. They live in fact, and breed, in among the corn —and other crops—or in the meadows, woods and copses, within easy reach of them. The daring robberies of gardens by wood pigeons (one of the wildest and most wary of birds) for instance, are well known; they will circle cautiously round overhead, and unless there is a man actually left there on sentry-go, to drive them away, the moment the gardener retires, they will swoop

down with closed wings, and plunder his favourite fruit bushes. The dinner hour for instance becomes well known to these birds, and dozens of them will regularly come for the purpose of plundering the garden at this quiet hour. And yet they are so wary and so quick and strong upon the wing, that it is very hard even to get a shot at the depredators. The only way is to conceal oneself under cover before hand, and to wait patiently till the thieves alight; but even so, so keen is their sight, the great chances are that they will see you, and be off before you have time to fire. (Wood pigeons are best shot by waiting for them under the trees they are known to roost in at dusk).

The partridge, and the quail etc., are however harmless birds which everybody ought to welcome; they live upon fallen grain, slugs, worms etc., and rarely can be convicted of doing positive injury to the farmer. So also with the rook; he may in general be accounted "the farmer's friend" rather than his foe, in consideration of the vast numbers of wire worms, grubs, and other injurious larvæ which these birds consume. They may as we know, be seen following closely after the plough, while in pursuit of their favourite occupation of feeding upon these insects.

From time immemorial it has been the custom to shoot the young rooks as they issue from the nests, and a good day's rook shooting with a shot gun, or better still perhaps with a pea-rifle, affords both good sport and good practice for the youthful sportsman. If rooks are not occasionally thinned off in this way, we know an instance where their numbers increased so tremendously that their countless droppings made the woods quite unpleasant, and it was generally held

they had become a perfect pest. The rook however, so far as our experience goes, is not a bird of the wilderness; he may exist there, as the pigeon used to do; but he prefers the kindly neighbourhood of the ancient church, or the ancestral hall. He is a distinctly aristocratic bird, and in Britain the rookery is rarely to be found except in the country seats of the noble, or of the squire of ancient lineage.

These facts however, tend to show how certain species of bird life cling to the society of man. Where he leads the way, they follow: where he prospers, they also prosper. They live upon man and his industry; and (when they prove good to eat) man returns the compliment by living upon them whenever he can get them.

But yet again there is another class of birds which live still more closely with man, and make their home in his cities, and their feeding grounds in their most crowded thoroughfares.

The London sparrow is a typical instance of these. This sparrow, or closely allied species of the same birds, may be seen almost everywhere in the great cities of the earth, in New York, in Calcutta, in Melbourne, or Cape Town. Everywhere he is to be found in close attendance upon man, as we can personally testify. In London and the cities of Europe he is still more or less a welcome guest; but in America great complaints of his misdeeds have been made, and his depredations upon grain and other stores have earned for him an unenviable notoriety there. In different parts of the world there are several other classes of birds which in like manner quarter themselves upon the cities in various capacities, either as grain

feeders or scavengers. A good instance of the latter is the common grey crow (*Corvus Splendens*) of India. In Calcutta and other great cities he may be seen everywhere, picking over scraps and refuse heaps; so bold has he become by impunity that he will sit upon the front of a dust cart while the attendants are filling it, intently watching everything that is put into it, and as the filled cart passes along the streets, two or three of these birds may be seen perched upon it engaged in turning over its contents. The "Myna" bird of India is another bird which, like the sparrow, feeds mainly upon grain; it is a pretty bird of the starling family, of which there are several genera in India. It may be seen pursuing its avocations with the utmost coolness among crowds of people on railway platforms, and elsewhere, where it will just keep out of reach of a stick. "The common 'Maina' (or Myna) bird (*Acridotheres Tristis* [Linn.]) is often domesticated, and will follow its master about the house like a dog. It soon learns to pick up words and sentences." *

We know an instance where one of these birds had become perhaps the very best "talking pet" we ever remember to have heard; it was at the Great Eastern Hotel in Calcutta (where a very long price was asked for it to would-be purchasers, though we forget the amount at this moment). Every morning with daylight it would begin in a gruff male voice:—"Boy! Bring some wine!" presently it would change to—"Waiter! Bring some water!!" in a lady's voice—

* *Cyclopædia of India*, by Surgeon-Gen. Edw. Balfour, 3rd Edit., 1885. Vol. ii., p. 1029 (Article "Myna"). (This bird has been introduced into Australia and New Zealand, and is now quite common in many places there).

or again—"Good morning, gentlemen! How do you do?" in a male ditto, and much more to the same effect; the accent and intonation being simply perfect.

In some countries (as for instance in Morocco) the stork makes its nest on the housetops, or on the mosques and ancient gateways, etc. Actuated by religious motives, these birds are never interfered with by the Mohammedans, and become so tame that a sitting bird will remain on its nest, though surrounded by a crowd of human beings, without moving. The picturesque figure of the stork standing on the housetop has often been introduced into pictures of oriental scenes by artists, and its existence as one of the *feræ naturæ* among the busy haunts of men, is as old as history itself, and is made allusion to in more than one passage in the Old Testament. Moreover in many oriental lands, the stork has come to be regarded as the emblem of peace or mercy,* and as such its presence upon the housetops is supposed to bring a blessing with it.

The kite, and the turkey buzzard, are other types of scavengers, which live among the houses in some parts of the world. In the streets of Vera Cruz in Mexico, for instance, the turkey buzzard used to walk about boldly in droves, and would hardly get out of the way of the passer-by, but would stand within a few feet of him or waddle away before him, exactly like a tame flock of turkeys.

* Among the ancient Hebrews for instance, the stork was called "Chaseda" or "Chasidah," signifying "pity" or "mercy"—probably from the care it is seen to take of its young. (See Cruden's *Concordance to the Scriptures*, 23rd Edit., 1868. Art "Stork"—also Calmet's *Dictionary of the Bible*, Edited by Chas. Taylor, 14th Edit., 1861, p. 840).

It is needless to add that these foul but useful birds are generally protected by law, and to kill or injure one of them would excite universal indignation: a fact of which these birds seem well aware, as they stand in no fear of man.

These instances of birds which take up their abode with man are readily accounted for, because they live upon the fallen grain and other refuse thrown out from his dwellings; but proceeding to the heart of the wilderness we are still met by other species which for various reasons love the society of mankind. Song birds for instance, as a rule make their haunt in the vicinity of villages and human places of abode.

It is a mistake sometimes made to suppose the wilderness is seldom enlivened by the song of the bird; almost every country has its beautiful songsters, and these as we have stated, as a rule seem to prefer the companionship of man as a neighbour.

The great Dr. Livingstone for instance, during his African travels, did not fail to note this fact:—"Birds of song (he states) are not entirely confined to the villages; but have in Africa so often been observed to congregate around villages, that when we approach the haunts of men, we know the time of the singing of birds is come." *

African bird life contains a good many varieties of beautiful songsters—and in the Algerian Sahara we have noticed a thing we have never remarked in Europe, namely that the common swallow, concerning whose extraordinary migrations we have already spoken, is there a beautiful singing bird. We once occupied a large room in a village, and through the open win-

* *Expedition to the Zambesi*, by David Livingstone, pub. 1865, p. 65.

dows the swallows used to enter in crowds. There were no ceilings, so they were free to seat themselves upon the roof-timberings, etc. These birds used to sing in the most beautiful way, in a succession of graceful twitters, most musical in tone. As long as one remained perfectly still, they would sit almost close beside one; but at the first movement they darted off like a flash of lightning. When a village is deserted by man we have the high authority of Dr. Livingstone for saying that it is quickly deserted by the singing birds also. *

In Upper Egypt also, at Luxor and other places, we have often heard the most beautiful notes proceeding from unknown birds which it was difficult to get a good look at. The very early mornings at the Luxor Hotel used sometimes to have a special charm of this kind, as it is surrounded by an extensive garden (for this desert country). The cool fresh air used then to be fragrant with the faint scent of mimosa blossoms, and before the sun got hot, the songs of birds used often to be peculiarly beautiful.

All the Arab villages are also everywhere beset by numbers of birds, which live in holes in walls and among ruins, and form a feathered colony in the midst of the desert. It may be that many of these singing and other birds may feed upon grain and things thrown out from the houses, but some of them (the swallow for instance) live on gnats, flies and aërial insects, which again generally swarm in myriads in Arab kitchens and other such places where food is kept. This will of course attract the fly catchers:—also we can have no doubt that the presence of man scares away

* *Expedition to the Zambesi*, by David Livingstone, pub. 1865, p. 65.

some of the wilder birds of prey; and in this way again, the friendly neighbourhood of mankind is an evident security to the bird; a hawk indeed will rarely, if ever, dare to carry off a bird when it is surrounded by human beings actively pursuing their daily occupations; though they may do so when everything is still.

As for the birds which follow man, they do not scruple to enter inhabited rooms, in search of food or shelter from the sun, and if not frightened or interfered with will often remain some time. In the Indian hotels and rest houses, we have frequently known birds to enter the dining rooms and go under the tables to pick up crumbs, while a large company was at table, and in Africa we have had birds frequently entering our quarters, both in dwelling houses and also in tents. The bird is essentially the ally and the friend of man: he attends him in his gardens and in his fields; he preserves his crops from the devastations of insect pests; he follows the plough, and eats up the larvæ of injurious grubs, etc., which are most detrimental to the crops; he makes the sylvan glades bright with the merry voices of feathered songsters. Again in the depth of winter when the snow lies deeply on the ground, when he hears his human friend tramping through the woods or working in the fields, forthwith he flies to meet him, in order to profit by the insects, larvæ, etc., which become exposed by the act of human movement. In Great Britain the robin is particularly marked in his attentions of this kind, and any kind of noise made by man in the course of his occupations, is sufficient during such "hard times" to bring all the little redbreasts within hearing to his vicinity. Finally,

if pressed by cold and hunger he will take refuge in his dwellings. A few crumbs, a little chaff or waste grain laid out within sight of the windows, will thus in snow time bring large assemblages of little birds to feed upon the bounty of man. Is it asking too much if we respectfully commend them to the hospitality of all true lovers of Nature at such seasons? Remember the poor birds when the frosts have sealed up the fountains and snow is deep upon the fields.

Turning now to the consideration of birds of prey, we shall preface our observations upon them by pointing out to the sportsman that birds of prey should be regarded as peculiarly his friends and allies. Not because they love him, or because he loves them, but because they point out to him the certain vicinity of a game country. Where there is no game, or where bird life is scarce, there birds of prey will also be scarce, or entirely wanting. The appearance in a country of numerous birds of prey therefore, indicates to the sportsman that he may get his gun ready and look out for chances. He will be sure to find, even if game animals prove scarce, that there are plenty of birds at hand, from some of which his larder may be replenished, and from which a dish "fit for a king" may often be prepared. So also the lion, the tiger, the leopard, the hyæna, the panther, and the wolf; they are never found except in a great game country, and their presence indicates, in like manner with birds of prey, the vicinity of herds of game, or at least of well-stocked pasture lands of native farmers. The roar of the lion or the howling of wolves, is therefore music to the ear of the true sportsman, who knows that there will soon be work cut out for his rifle.

It has been remarked that in great forest countries very few birds of prey are seen: the thick cover narrows the scope of their hunting powers very much. *

The forests may contain a good deal of game, but heavy forest is seldom a good place for sport of any kind, as we have already shown in our chapter on Forest Hunting, game being difficult to find and hard to shoot. Most game birds which inhabit forest countries are generally found on its outskirts, or are scattered along the course of the rivers and streams with which its fastnesses are seamed.

Excellent wildfowl shooting is sometimes to be had upon these rivers, or upon lakes and other extensive sheets of water which are found in almost every great forest, because the existence of the forest itself is due to a plentiful rainfall. That being so, we may generally expect to find within its midst many sections of low-lying grounds converted into marshes or lakes. Extensive marshes are generally common, where heavy timber no longer exists except upon hillocks and dry spots. In such localities long grass, rushes, reeds, and water-loving plants and bushes take its place. The deeper depressions form pools or lakes; and here admirable sport with wildfowl may pretty generally be expected, if a man does not mind the plague of mosquitoes and other flies. Hawks and other birds of prey, with fishing birds, like herons, pelicans etc., will therefore be attracted to such places.

But with these exceptions, birds of prey generally frequent the edges only of the forest, the open bush country, the mountain, the moorland, and the plain,

* See *Emin Pasha's Letters from Central Africa*, p. 406. Edited by Professor Schweinfurth and translated by W. R. Felkin, London 1888.

because it is in these localities where bird and animal life is most plentiful—and in such places they are often exceedingly numerous and destructive, especially among young birds which have not yet attained their full strength, and there can be no doubt that in many countries they form a serious impediment to the increase of game.

This picture of perpetual and hereditary destruction among the animal creation is not an agreeable one to contemplate; and yet we see it pervading the whole system of Nature: evidently in pursuance of a positive law, emanating from the decree of the Creator's wisdom. The world in fact, is one vast slaughter-house. From the huge whale to the most minute animated germ that moves upon the earth, or in the waters, we everywhere behold examples of one species preying upon others, and maintaining its own existence by the death and destruction of weaker or inferior creatures, until at length we reach the level of the human race itself—for in man this scale of graduated tyranny, and of predatory rapine appears to attain it last and greatest example. The moralist and the humanitarian visionary may affect to deny or to cavil at it—but when all is said and done this great salient fact will still stand forth in all its pristine distinctness—that the Law of Nature is the rule of force, and of force only. Everywhere the strong oppresses and destroys the weak: nowhere do we find a single example of that most visionary of all dreams—the dream of Universal Peace.

The learned scholar, as well as at the same time the first soldier of Europe, the late German Field Marshal Count Helmuth Von Moltke, is said to have

remarked in reply to a query as to what he thought of the possibility of a universal peace—"It is a dream," he said, "and not even a beautiful dream." Everything in Nature seems to tell us that the great Field Marshal was right. In every department of Nature we see that life is a perpetual warfare—a struggle for existence in which the strongest, and therefore the fittest, survives, and the weaker perishes, and so it will ever be.

The great traveller and careful observer of Nature, the late Sir Samuel Baker, who has lately passed away, has given us an admirable illustration of this in the closing paragraphs of his last work, entitled "Wild Beasts and their Ways."—"The empty stomach must be filled (he says), therefore one species devours the other. The fowl destroys the worm. The hawk destroys the fowl. The cat destroys the hawk. The dog kills the cat. The leopard kills the dog. The lion kills the leopard, and the lion is slain by man. Man appears upon the scene of general destruction as the greatest of all destroyers." *

How truly man may be called "the greatest of all destroyers," only those who have made acquaintance with "the Wilderness and its Tenants," can form any adequate conception; for under their own eyes as it were, they have seen mighty continents stripped of their primeval inhabitants; vast hunting grounds where not a head of game remains, many species having become actually extinct; and boundless plains over which, within living memory, herds of beautiful game gambolled in countless numbers, now silent as the tomb. It will be needless to do more than cite the instances

* *Wild Beasts and their Ways*, by Sir Samuel W. Baker, Vol. ii, p. 376 (Concluding Paragraph).

of South Africa and North America as examples.

The bird however, comes less into conflict with the human invader than the beast; and therefore in many cases, the bird has maintained its position where the other has perished. It does not break down the farmer's fences, nor eat up his grass like the quadruped; and if they partake of his cereal grain, birds compensate for much of the harm they do by the destruction of insect enemies, the most to be dreaded of all the farmer's foes.

Partly as one of the results of this species of mutual co-operation as we have already pointed out, is the tendency of many kinds of birds to congregate in the vicinity of human abodes. In the South African Veld and elsewhere, therefore, the neighbourhood of towns and villages is often marked by the increased numbers of the different kinds of birds of prey, which likewise follow the advance of the human tide. These birds, which are generally seen hovering near such places, may be divided into two classes: those that prey upon the living creature, like the hawk and the kestrel; and those that feed upon carrion or the remains of creatures whose vitality has departed from other causes; while some few of them, like the kite, probably combine both capacities. They will kill game for themselves when opportunity offers, or feed upon a dead carcase, if it comes in their way.

All these birds are distinguished by the same sort of flight which is characteristic of birds of prey, sailing to and fro in the higher atmosphere in long circles with extended and apparently motionless wings. This is the method of hunting which, we may say, is adopted by them all; and as they slowly sail aloft,

they minutely watch the earth beneath with eyes whose keenness has become proverbial in the common expression of "hawk-eyed."

The study of the habits of these birds is both curious and interesting, and the means by which they discover their prey has given rise to much conjecture. It has been supposed by many that the vulture tribe, at all events, are often guided by their acute sense of smell, but after giving the matter much consideration and long years of observation, we have become convinced that this view is an erroneous one. Like the hawk, which descends from on high with one fell swoop upon the defenceless sparrow or partridge, we are convinced that the whole of this class of birds, carrion feeders and all, find their quarry solely by the exercise of sight.

We think that there can be little doubt that in countries where vultures abound, the atmosphere is always peopled, at different altitudes, by layers of these scavengers;* which are continually wheeling in immense circles during daylight, very often beyond the reach of human eyesight, as they watch the terrestrial landscape with telescopic sight which is within the field of view beneath.

Travellers who have from long habit instinctively acquired the practice of frequently turning up their gaze towards the sky, will have been certain to remark how often in the cloudless atmosphere of tropical and semitropical lands, they will have observed minute and

* It is remarkable that the ancient Anglo-Saxon word "sceawian" from which the word "scavenger" is presumably derived, means "to inspect"—the original "scavenger" having been an inspector of goods exposed for sale, and also of the streets. (See Chambers' *Etymological Dictionary*, new Edit., 1891, under the word "Scavenger").

far distant specks, almost like flies, floating in the regions of space. An attentive examination of these objects will show that in most cases they are vultures, thus keeping their aerial watch with untiring wings, and the use of a good glass will frequently put the matter beyond the possibility of a doubt. The altitudes at which they are seen are often so great that they would entirely escape the view of a careless observer, indeed it is only the practised eye that would be at all likely to detect them. Charles Darwin has expressly pointed this out in his Naturalist's voyage in the *Beagle*—and we can fully endorse his observations. When however the sportsman and wilderness hunter comes to consider what a number of these immense birds will suddenly come into view, when an animal has been recently killed—first as mere specks in the far distance, and then gradually increasing in size as they come nearer and nearer—it will be evident by how great a number of such birds the air must be peopled.

Before the fatal event, not a bird was to be seen in the whole extent of the celestial vault. From whence then have these innumerable companies of winged harpies descended out of the regions of space above?

We cannot doubt that they have all the while been watching far up beyond the reach of human eyes, both the man and his occupation. That they have seen the fatal shot fired, and the quarry fall, and that they know that there will be something left for their share. An immediate swoop is therefore made by the nearest birds. All the other kinds which are also watching everything that passes on the earth beneath from still higher altitudes, and which have witnessed the rush of the first birds towards the prey, instantly follow suit, and so

in a short time the signal being thus communicated from one tribe to another, the air is full of a great company of gigantic birds, wheeling rapidly in circles over the fallen dead. Even then the highest birds are often seen sailing at such an altitude that though the spread of their wings may be something like 6 feet from tip to tip, they appear as mere specks balanced upon the azure depths of space.

It has moreover been remarked that the different kinds of vultures follow each other in regular succession, showing that these various species have arrived from different distances. This circumstance is not one of occasional, and perhaps accidental occurrence; but is a regular rule, which may be said to be always followed. This therefore affords strong circumstantial evidence of the truth of the theory, that these birds float in distinct layers throughout the atmosphere, at different elevations above the earth, and consequently they thus follow each other in their arrivals in regular order of sequence. The late Sir Samuel Baker, than whom there was no more acute or careful observer of all matters connected with the hunter's craft and life in the wilderness, has expressed himself most clearly and strongly as entirely of this way of thinking--and in what, now that he is gone, we shall perhaps be pardoned for indicating, as being in our opinion the best written and most interesting book of travel and sporting adventure that has ever been published, he has stated his experiences of these matters as follows:

"Throughout all the countries that I traversed, these birds (vultures) were in enormous numbers." * "I have paid much

* *The Nile Tributaries of Abyssinia*, by Sir Samuel White Baker, 1867, p. 491.

attention to their habits, and feel convinced that all birds of prey are attracted to their food principally by their acute sense of sight. If a vulture were blind it would starve. If birds trusted to their nostrils they would keep as near the ground as possible, like the carrion crow. In watching the habits of vultures (he continues) it is interesting to make the experiment of concealing a dead animal beneath a dense bush. Vultures will never find it unless they have witnessed its death. If so they will have pounced in their descent, while you have been engaged in concealing the body. If an animal is killed in thick grass, 8 or 10 feet high, vultures will seldom discover it. I have frequently known the bodies of large animals such as elephants or buffaloes, to lie for days beneath the dense nabbuk bushes, unattended by a single vulture; whereas if visible they would have been visited by the birds in thousands." *

Experiments have also been made by Mr. Charles Darwin and others, to test the scenting powers of the vulture tribe, when in confinement. Mr. Darwin for instance—

"folded up a piece of meat in paper and walked along with it in his hand close to a line of condors, but they detected nothing; next he threw it on the ground within a yard of an old male bird. He looked at it for a moment, and then regarded it no more. With a stick he pushed it closer, till at last the bird touched it with his beak. The paper was then instantly torn off with fury, and at the same moment every bird began struggling and flapping to get at it. Under the same circumstances it would have been quite impossible to deceive a dog."

Mr. Darwin then goes on to relate a series of experiments tried by Mr. Buchanan of the U.S. with turkey buzzards.

* *The Nile Tributaries of Abyssinia*, by Sir Samuel White Baker, pp. 192 to 194.

"He covered a quantity of highly offensive offal with a canvas cloth, and strewed pieces of meat on top of it, which the vultures ate up with their beaks within one eighth of an inch of the putrid mass without discovering it. A small rent was then made in the canvas, when the offal was at once discovered. Similar experiments were tried several times with the same results, and these facts are attested by the signatures of Mr. Buchanan and six others." *

This would seem to place the matter almost beyond the possibility of a doubt. The condor spoken of above is an immense bird inhabiting the mountain region of Peru and Chili in considerable numbers, which frequently measures from 8 to 9 feet from tip to tip across the wings, and they may often be seen circling over the earth at such an enormous height that they look like mere specks in the azure vault.—At that vast altitude common sense will show that it is highly improbable that they could scent anything upon the earth beneath. The flight however of these great birds is singularly majestic, and a model of graceful power. Mr. Darwin, says he "watched a flock of condors (near Lima) ascending and descending for nearly half an hour without ever seeming to give a single flap of the wings, but the head and neck turned frequently," † thus showing how intently they were watching the landscape below.

This power of birds to sail through the atmosphere without appearing to use the least exertion to direct their flight is a very wonderful one; they appear to

* *Journal of Researches into Natural History and Geology during the Voyage of H.M.S. "Beagle"* (1832—1836), by Charles Darwin, 1873, p. 185.

† *Ibid.*, p. 185.

float, so to speak, on a sea of air, as securely as a water bird resting upon the glassy surface of a lake composes itself to take its natural repose. This strange power seems to be common to all birds of prey, which have to be constantly on the wing while watching the earth beneath in search of food, and it is shared by many sea-birds which do the same by hovering over the waters of the deep. The flight of the sea-gull for instance, as it follows a powerful steamer for miles, on the chance of something being thrown overboard, is surely the perfection of grace and skilful balancing, but the floating on air without using the wings is less continuously maintained by sea-gulls than by regular birds of prey, such as eagles or vultures.

We have always regarded the description given by Sir Samuel Baker of the arrival of vultures in the Soudan, from enormous altitudes, as soon as an animal has been shot, as one of the finest passages in his book. We therefore quote it in all its principal details for the benefit of our readers:

"It is an interesting sight (he says) to witness the arrival of vultures at the death of an animal, when a few moments before not a bird has been in sight in the cloudless sky. I have frequently lain down behind a bush to watch the arrival of the various species of birds in regular succession—

No. 1. The black and white crow.

No. 2. The common buzzard. It will stoop at a piece of red cloth in mistake for flesh: thus proving that it depends more on the vision than on scent.

No. 3. The red-faced vulture.

No. 4. The large bare-throated vulture.

No. 5. The marabou stork—sometimes accompanied by the adjutant.

Vultures and the marabou stork fly at enormous altitudes.

I believe every species keeps to its own particular elevation, and that the atmosphere contains regular strata of birds of prey, which, invisible to the human eye at these enormous altitudes, are constantly resting upon their wide-spread wings watching with telescopic sight the world beneath. At that great elevation they are in an exceedingly cool temperature, therefore they require no water; but some birds that make long flights over arid deserts, such as the marabou stork, and the bustard, are provided with water sacks: the former in an external bag a little below the throat, and the latter in an internal sack—both of which contain a large supply.

As the birds I have enumerated invariably appear at a carcase in regular succession, I can only suggest that they travel from different distances, or elevations. Thus the marabou stork would be furthest from the earth. The large bare-necked vulture would be the next below him; followed by the red-faced vulture, the buzzard, and the crow. That (the crow) is generally about the surface. From their immense elevation, birds of prey possess an extraordinary field of vision, and although they are invisible from the earth, there can be no doubt that they are perpetually hunting in circles within sight of each other. Thus, should a bird discover some object upon the earth, his sudden pounce would be at once observed and imitated by every vulture in succession. His rush would act like a telegraphic signal to others, which would be rapidly communicated to every vulture at successive airy stations.

I have frequently watched these birds when I have shot an animal, and my people have commenced skinning; but not a bird has been in sight as I have lain upon my back and gazed into the spotless blue sky; but hardly has the skin been half withdrawn when specks have appeared in the heavens—'Caw, caw' has been heard from neighbouring trees: the buzzards have swept down close to my people and have snatched morsels of clotted blood from the ground. The specks have increased to winged creatures, at that great

height resembling flies. Presently a rushing sound has been followed by the presence of a red-faced vulture that has fallen from the heavens, in haste, with closed wings, followed quickly by many of his brethren. The sky has become alive with black specks in the far distant blue, with wings hurrying from all quarters. At length a coronet of steady soaring vultures forms a wide circle far above, as they hesitate to descend, but continue to revolve around the object of attraction. The great bare-necked vulture appears. The animal has been skinned, and the flesh secured. We withdraw 100 paces from the scene: a general descent takes place: hundreds of hungry beaks are tearing at the offal. The great bare-necked vulture claims respect among the crowd, but another form has appeared, and descends rapidly. A pair of long, ungainly legs, hanging down beneath enormous wings, now touch the ground, and 'Abou Seen' (Father of the teeth or beak—the Arab name for the marabou) has arrived, and stalks proudly towards the crowd, pecking his way with his long bill, and swallowing the lion's share of the repast. 'Abou Seen' last, but not least, has arrived from the highest region; while others have had the advantage of the start." *

In this wonderful description of a scene that may be witnessed any day in lands where many vultures are, it will be observed that the largest and strongest birds come last, and hunt at distances probably several miles above the earth.

The idea of several layers of vultures, existing one above the other in the regions of space, is however by no means a new one; on the contrary, it is one of very ancient date, descending to us from the days of Egyptian and Hebrew mythology, when it was supposed that the heavens were divided into

* *The Nile Tributaries of Abyssinia*, by Sir Samuel White Baker. 1867, pp. 493 to 496.

several stories, or tiers, "and that these birds were ever ready to hurry downwards at the sight of prey, from their topmost region, in the sevenfold heaven"*—and the vulture, as we know, among the ancient Egyptians was not only tolerated, but was held in high veneration as a sacred bird—and in the hieroglyphics upon some of the most ancient tombs, the figure of the seated vulture is constantly portrayed with such fidelity as to prevent the possibility of mistaking it for any other bird.

The rapid way in which vultures will pick the skeleton of a large animal perfectly clean, all except the bones, is well known; Mr. H. A. Bryden for instance, in South Africa, where they are very numerous, says he "has seen two large elands as big as cows picked clean in a few hours. The numbers and eating capacity of these birds in a wild country, where they are not in the habit of dining each day (he states) seem to be illimitable." †

At Bombay, where the Parsees expose their dead, to be consumed by vultures, in what are known as the "Towers of Silence" erected on Malabar Hill, the guardians have assured us that within two hours after the exposure of a body the process is complete, and that in times of cholera and other outbreaks of malignant disease among the human population of Bombay, the system still works with unabated efficiency, and no deleterious effect is produced upon the vultures; hundreds of whom may be seen sitting on trees, in the piece of wild ground that surrounds these towers,

* See Professor Georg Schweinfurth's *Heart of Africa*, 1874, Vol. ii, p. 232.

† *Gun and Camera in South Africa*, by H. A. Bryden, 1893, p. 645.

one of which is more than 250 years old. Of recent years the late Sir Jamshidji Jijibhai, a well-known Parsee philanthropist, has constructed most beautiful gardens, at enormous expense, in the neighbourhood of these towers, where mourners attending the last ceremonies over the remains of relatives can sit in contemplation of the most lovely flowers and scenery. No one is ever allowed to enter the towers but professional bearers, two or three of whom convey the bodies in through a small door some distance above the ground, the only aperture into them that is left in the exterior circle of wall. At the time of our visit the attendant pointed out the door, through which we were assured the wealthy and public-spirited founder of these gardens (together with other charitable institutions at Bombay) was himself thus carried in, when his race on earth was run.

Before passing to the consideration of other matters we may remark that of course upon the closing in of the night both vultures, as well as all other kinds of birds of prey that hunt by sight (except some nocturnal species that hunt at night only) descend to the earth and take their nightly rest, perched upon trees, in readiness to renew their pursuits with returning day, and we believe they generally assemble for roosting purposes much in the same way as is done by rooks. Indeed we have ourselves seen extensive roosts of these birds, which had already settled for the night. Such spectacles are common in the neighbourhood of towns and other places in whose vicinity offal is sometimes to be picked up in considerable quantities, in which situations we need hardly remind our readers, that scavenger birds are invariably protected by law in all Oriental lands.

We have for instance seen large companies of vultures roosting in the trees of gardens, not many miles from Calcutta, some of the trees within sight of the public road being loaded with them.

Then as regards their resting places: these we believe to be generally located in some retired spot in the wilderness, where enormous assemblages of these useful but unclean birds collect from all quarters, and associate like rooks during the breeding season.

Captain Forsyth has left us a description of one of these wild scenes, which he accidentally came upon during his wanderings among the Hatti Hills, in Central India, located among some magnificent basaltic cliffs, embosomed in the forest:

"The path (he says) wound along the top of a long spur of naked basalt. At one point the rock formed a sheer cliff many hundreds of feet in height, composed of a vast conglomeration of pentagonal pillars, broken off at different lengths. This singularly favourable situation for nest building had been occupied by an immense colony of vultures, the whole face of the rock for miles being whitened by their droppings, while numbers of these birds were perched on the cliffs, or sailing over the ravines." * "I had often (he goes on to say) wondered where these birds bred, for although there are myriads in all inhabited tracts of Central India, only a few nests are to be seen, here and there, in the tops of trees.—Here was the puzzle solved in the grim and retired solitude of the 'Valley of Vultures.' But a single hill—a few minutes flight—separated them from the thickly populated plains, and yet that ravine is probably as seldom looked upon by the eye of man as if it were a guano island in the Pacific Ocean." †

* Most of these were either the brown vulture (*Gyps Bengalensis*) or the common white scavenger (*Neophum Perenopterus*).

† *The Highlands of Central India*, by Captain James Forsyth, Bengal Staff Corps, Edit. 1889, pp. 246—47 (originally published 1871).

This Valley of Vultures seems to us a highly characteristic picture of the habits of wild birds during the nesting season. However much they may view with indifference the presence of man during their daily round of search in quest of food, at these periods they generally retire to some lonely haunt, where amidst the solitude of the wilderness, they can rear their tender young, hid far away from all who might desire to break in upon the great peace of Nature which there perpetually reigns.

The daring and address which birds of prey will often exhibit in carrying off their game is no less remarkable than the suddenness and rapidity with which the act is performed. We have known a hawk to come right into an open window of a drawing-room at home, and dash against the bars of a canary-bird's cage, while several people were seated in the room. The cage of course, was the only thing that saved the canary, which did not recover the shock for days; and the hawk upon seeing he was foiled, was gone again, almost before anyone had time to turn round.

In India the boldness of kites * is sometimes extraordinary; if meat is left unguarded for a single instant, they will snatch it up and be off long before it is possible to do anything to recover it. Sportsmen in India are apt to suffer from the same sharp practice. Mr. Rice for instance, in his well-known book on sporting matters in India, states that "hawks of different sorts may often be seen keeping up with the guns, and occasionally pouncing down on any wounded

* *Milvus Govinda*—the pariah kite of India

bird, and making off with the same, even before it has fallen to the ground." *

Speaking of kites in India, Captain Lugard in his recent work shows that when a man has caught and cooked his dinner, unless he looks sharp after it, he is not even then altogether secure from the visits of uninvited guests:

"A friend and I (he says) had been shooting. We (sat and) faced each other, on two campstools. A narrow box served as table between. He had seized his knife and fork and was about to plunge it into the bacon (from a tin that had just been opened), when a blow from the wing of one of the kites across his shoulders almost upset him, and he recovered his balance to find our piece of bacon far up in the blue vault of heaven, and the kite discussing our breakfast in our stead." † Captain Lugard then relates the story of an amusing, but cruel device used by Indian children to pay off these daring intruders, somewhat in their own coin. "Indian urchins (he says) delight to tie bits of meat to the opposite ends of a string. A kite seizes the bait, and sails aloft with it, pursued by a rival claimant. No. 2, seeing the other piece, swallows it. Thereupon follows the tableau which pleases the Indian urchin." §

Great numbers of these birds are generally to be seen about Indian villages and bazaars, where they are always on the watch to snap up every morsel of food that is not actually watched by the owner. When markets are over they, and the common grey carrion crow, will pounce into the meat stalls and whip off in an

* *Indian Game from Quail to Tiger*, by W. Rice, edit. 1884, p. 3.

† *The Rise of our East African Empire*, by Captain F. D. Lugard, 1893, Vol. i, p. 276.

§ *Ibid.*, Vol. i., p. 247.

instant every bit of offal, or fallen morsel, that the merchant has left behind, even though a crowd of natives may be arguing and gossiping within a few feet of the spot. Indeed while the concourse of people in the market is at its greatest, it is common to see a number of keen-eyed crows perched on the cross beams of the roof, but a few feet above the heads of the crowd, knowingly twisting their heads from side to side, as if to hear the news of the day, while intently watching for the chance of making off with some tit-bit.

There can be do doubt that the numerous hosts of these birds, wherever human beings are collected together in considerable numbers, throughout Hindustan; act as a powerful sanitary agency in the preservation of public health and cleanliness in the native quarters of towns, and indeed in the European cantonments also; this will be obvious, when we remind our readers that practically *no drainage whatever* exists. The exceedingly flat nature of the country generally, and the low-lying character of the coast line, to a great extent renders any system of drainage on the European plan impossible—moreover, it is very questionable, for various reasons of a technical nature, whether, if there was fall enough, any at present known sewerage system would be desirable. This however opens up a vast number of debatable questions irrelevant to our present subject. Consequently, the rôle which these useful birds play in the economy of Nature is one of extreme importance. In Egypt the kite (*Milvus Ægyptius*) is extremely numerous, and in Cairo and other Egyptian towns they may be seen continually hovering over the city on the look-out for food.

It is probably seldom remembered now-a-days that formerly the kite (*Milvus Ictinus*, or the brown European variety) was very common all over Great Britain, where it is now practically extinct. "Three or four hundred years ago (says the *Encyclopædia Britannica*) foreigners were struck with its abundance in the streets of London," where it was doubtless the public scavenger of those days, much as it is in many oriental towns and villages at the present time. "Wolley has well remarked of the modern Londoners, that few who see the paper kite hovering over the parks, on fine days in summer, have any idea that the bird from which they derive their name used to float all day in hot weather, high over the heads of their ancestors." *

The functions which birds of the hawk tribe fulfil in their place in Nature, in killing living birds, is also no doubt one of great moment to the general welfare: though in England and other places where game is preserved, their action is regarded as in every way injurious. It is however probable that this is a very erroneous view to take of their functions: because in every wild country the more numerous the birds of prey are found to be, the more numerous are game birds and indeed every kind of bird life. Here therefore, where there is no "vermin killing" to keep up the head of game, the quantities of birds frequently largely exceed anything that is met with in the preserved moorlands and covers of Great Britain. In some parts of India for instance, the quantities of pigeons, doves, quail, myna birds, and other bird life of many sorts is simply enormous; though birds of

* *Encycl. Brit.*, 9th Edit., Vol. xiv, pp. 103 and 104 (Article "The Kite").

prey of all kinds are very numerous, and are never interfered with. No doubt hawks *do* kill many valuable birds; but if they do, they keep down the excessive increase of voracious grain-feeders of many kinds; and above all, they catch and destroy every weakly or sickly bird. In this way we cannot doubt they prevent epidemics among the bird tribes. It is supposed by many thoughtful persons for example that "the grouse disease" in England and Scotland, is the result of the destruction of birds of the hawk tribe. Sick birds thus became perpetuated, and disease spread and has swept off many more grouse than ever the hawks would have done. Grouse on the other hand by over-preservation had become too numerous and crowded—and as we know one of the most certain results of overcrowding of man, animals, or fowl, is the occurrence of epidemic diseases.

Wherever large numbers of creatures in a state of nature are crowded together, the whole experience of history shows that devastating epidemics are certain to occur. Accumulations of dirt, where a few individuals only are present are insufficient to produce plagues; but the moment population becomes numerous, poisonous exhalations are evolved, food and water become contaminated, and pestilence breaks out. The only reason why the plague no longer visits London, as it always used to do up to 1665, is because of artificial sanitary precautions, adopted by man, as the results of his experience on being visited with the consequences of neglect of such safeguards.

Birds and animals therefore, which adopt no such precautions, ought to be, and indeed *are* peculiarly liable to outbreaks of various kinds of very fatal diseases.

A good example of this is seen in the case of domestic fowls. The attempt has been repeatedly made to have a fowl farm, and rear large numbers of birds for the market; but the result has invariably been disappointment and loss; because as soon as the ground becomes contaminated by their wholesale assemblage, disease breaks out and the birds die off in numbers. Gamekeepers in consequence, are so well aware of the fatal results of contaminated land, that in pheasant rearing, or in the rearing of any kind of bird in large numbers, they make a point of removing the coops every season to fresh grounds as far away as possible from the place where the birds of the previous year were raised.

Plagues among rabbits and hares, in the same way are common.—We remember being once asked to shoot in a nobleman's demesne, where the rabbit shooting was held to be excellent. On that year however, some unknown disease had broken out among them and we should be afraid to say, for fear of being held to have exaggerated, how many dead and dying rabbits were picked up by the beaters in the course of that shoot. So again, in a gentleman's ancient park, full of hares, we were present when a distemper had broken out there, most fatal in its nature; many dozens of fine hares were daily seen dead and dying, the latter invariably casting up a quantity of frothy matter from their mouths.* We can have little doubt as to what was the matter: it was a form of typhus fever of the hare—the same in the case of the rabbits. So with our dogs. We all know the very fatal nature of what is popularly known as "distemper" in the dog. Most of us have lost valuable dogs that we were fond of, by it.

* From notes taken at Hilton Park by the Author.

It is "typhus fever" of the dog. * It attacks them in various ways, and produces symptoms varying greatly in different cases. As we know by bitter experience, it does the same in the human subject; and in case of recovery, in nearly all cases it confers that immunity from second attacks, characteristic of zymotic † disease both among man and throughout the brute creation; and we cannot doubt that the same law applies to the bird that flies in the air, to the fish that swims in the water, and to the insect that crawls upon the ground—did we only know it, and did human observation extend far enough to see it and prove it.

These considerations may seem to some minds far removed from the subject of wildfowl and wildfowl shooting: but in reality this question of the periodical outbreak of pestilence among winged fowl and the lower orders of animated creatures, exercises a vast influence upon bird life, and renders delicate birds unequal to the strain placed upon their physical powers in their migrations, and even in their search for daily sustenance: with the certain consequence of great mortality occurring among them, ostensibly due to other causes—such for instance as abnormally severe weather, or a supposed scarcity, or failure of their natural supplies of food; whereas had the birds been in vigorous health, it is probable that they would have surmounted these trials without the sudden and remarkable decreases in the numbers of certain species which are periodically noticed by observant persons;

* That "distemper" in dogs is typhus fever, is now generally admitted by veterinary surgeons. See *The Dog in Health and Disease*, by Stonehenge" (Editor of the Field) 3rd Edit., 1879, p. 423.

† A term applied to diseases where there is a specific poison in the nature of a ferment—from the Greek ζιμωω "to ferment."

and personally we entertain the strongest conviction that it is in this way very often that the ultimate extinction of certain races is brought about. This theory, we need hardly say, may be right or otherwise: that is as may be; we have, however, ventured to say what we think upon the subject. Certain it is, that numerous races of creatures have lived upon this earth, and from one cause or another have been withdrawn from the sum of animated existence; we know not how nor why, nor wherefore. It is not uncommon to hear men jumping to the conclusion that they were exterminated by natural enemies: nor shall we even venture to affirm, or deny, the possibilities of this having been so; all we can say is, as we have before observed in the preceding pages of this chapter, where what are classed as vermin, by gamekeepers and others, multiply unchecked, according to the order of nature, without the interference of man; game of every kind, in some wild countries, seems to swarm in unwonted prosperity.* Then we hear it stated—"It was man, ruthless man, that destroyed it." Unfortunately there is no doubt that this is so in certain cases, notable instances of which we have not failed to cite in these pages; but then, in the case of bird life, which is the immediate subject of our consideration at present, we have endeavoured to show,

* In expressing ourselves thus, we desire to guard against being taken to disapprove of game preservation. We are, let us straightly say, in favour of preserving every species of property. What we refer to is therefore to be regarded as an objection to the over-preservation, not the moderate, and laudable preservation of game. But we are opposed to the system of extermination of the wild birds and creatures which Providence has placed in our midst—because in our short sightedness we deem them useless, or injurious. We venture therefore to believe that were "vermin" to be totally exterminated, we should soon have cause to regret it, and to wish to have them back again.

not altogether as we trust without evidence or without reason, there are certain sorts of birds that follow cultivation, and really prosper nowhere else except near the destroyer's threshold, but we have our bad seasons and our good seasons, and birds live and die, according to no known rule: some years it is hard to rear the chicks of hand reared fowl, at all—though hatched successfully—because of the appearance of epidemic disease, to which various names and causes are assigned; it is then said to be a bad year for birds.

Now as to this question of certain sorts of game following cultivation, and thriving among the haunts and habitations of man, in addition to the humbler feathered races which we have already mentioned as being attendants upon him. Mr. Herbert (the American "Frank Forrester") a well-known authority upon game and sporting matters, has the following observations upon the subject, in his work on American Field Sports, which more than bear out what we have said with reference to it:

"It has been alleged (he says) that the increase of population, the spread of cultivation, and the transfiguration of woods and wastes into corn lands and pastures, are in themselves an irremediable cause for the disappearance of all the various kinds of game.—Were this the case it would be needless to waste words on the subject: but so far is it from being the case, that with regard to very many kinds of game, the very converse of the proposition is true. The wild turkey, the pinnated grouse and its congener the ruffled grouse, as also the spruce partridge, all unquestionably do make their home in the wilderness; the last-named there exclusively. But all the others (birds) without exception prefer the vicinity of cultivation, on account of the plenty, and choicer quality of the food; and are nowhere found in such abundance, as in

those localities which afford a combination of rough, wild lying ground, with highly cultivated land. Neither woodcock nor quail (he goes on to say) are ever found in the depths of the forest, aloof from human habitations; though both require woodland, as a *sine qua non* for their habitation. Moreover in places where they are entirely unknown to the first settlers, where they do not in fact exist at all, they speedily become abundant, as soon as the axe levels the forest, and the admitted sunbeams awaken the germs of that animal and vegetable life on which the birds subsist."—"It may be assumed at once, that the spread of agriculture and civilization, in themselves, have no injurious operations, but rather the reverse, on any kind of winged game, and that in some instances the progress of one is simultaneous with the increased numbers of the other." *

This emphatic statement, proceeding from the pen of an American sportsman of authority, half a century back, before the time when the great rush of population commenced towards the western hemisphere, is very significant, because there was then daily opportunity of seeing what was the stock of winged game in the primeval solitudes, compared with the amount found in the neighbourhood of the settlements—and as we have seen, Frank Forrester distinctly maintains, as a matter of actual fact within his own cognizance, that the birds settled and flourished amid the dwellings of man, and feasted on the insects turned up by his plough and the grain that fell from his sheaves—and, shall we say it? upon his growing crops themselves.—Yes! there can be no doubt about it; the birds *will* eat the farmer's corn; so will his horses; so will his servants,

* *Frank Forrester's Field Sports of the United States*, published New York 1852, Vol. i., pp. 14 to 17. (Frank Forrester was the *nom de plume* of Mr. Henry William Herbert, and this description was written *circa* 1845).

eat of their employer's good cheer; and yet it pays to keep horses, and it pays to keep and feed servants: neither could in fact be done without; and so, if we may venture to say it, and to uphold what is rank heresy in the eyes of many farmers, so do the birds pay to keep about one's dwelling and about one's farm.

That they consume a certain amount of valuable property, like the horses and the workmen, there can be no doubt; but if they do, the farmer gets value for it in the destruction of injurious insects. For remember, if we have spoken of pestilences among the animal creation, we have also to record the fact that disease, in other words pestilence, is equally liable to destroy the vegetable productions of the earth; they are afflicted with various forms of "blight" as it is called. These are the pestilences of plant life, which rage even with a higher rate of mortality than the "Black Death" ever did in the purlieus of London, of Florence, or of Constantinople. We need cite but two instances of it: viz., the potato disease (or plague) in Ireland, and the vine disease in France and elsewhere.

Both are due to parasitic growths—the first to a minute fungus known as the "*Peronospora Infestans*," * and the second to an insect called the "*Phylloxera Vastatrix*." † But then most, perhaps all of our human maladies, are due to the same set of causes. This has been well pointed out by Budd, and others, in what is known as the "Germ Theory of Disease" and the existence of malignant organisms in modern pathology termed "Microbes." This of course lands us in a vast

* *Encycl. Brit.*, 9th Edit., Vol. xix., page 597.
† *Ibid.*, Vol. xxiv., page 329.

field of scientific research, which it would be totally impossible to do more than merely hint at here; nevertheless, under other names as we venture, rightly or wrongly, to believe, these things are all merely modifications of the same natural law, affecting the various orders of animated beings, which even descends to govern the operations of the germs themselves (for we know that the "vis medicatrix Naturæ," is in general curing its own diseases) by a pestilence, or sudden and various forms of death, among the micro-organisms themselves. This is splendidly illustrated in the vegetable world, where "blight," the effect of countless myriads of minute organisms, preying upon the tree or plant, suddenly disappears, and from no apparent discoverable cause, become as though it had never been. What is this, but a tremendous pestilence sweeping away these innumerable parasites?—Let us quote as a specific instance of this the great blight recently affecting the silver fir trees (*Picea Pectinata*), in many parts of Great Britain. We had occasion to pay great attention to this, to try to devise some remedy, to combat the fell disease that was destroying these beautiful and valuable trees. We saw a promising young plantation whose stems and branches were literally covered with a white mildew (apparently)—these were all insects. *—We came back next year in the autumn time to observe the progress of the disease (1893), and to our surprise, not one of them

* On submitting specimens of diseased twigs and bark for examination to the Entomological Section of the Museum of Natural History at South Kensington, London—our views were confirmed by the official report, which was that the insect is "one of the Aphidœ probably of the genus chermes" (see also description of "The Larch Aphis" by Miss Eleanor Omerod, consulting Entomologist R.A.S., in her *Manual of Injurious Insects*, 2nd Edit. 1890, pp. 222 to 226).

was left. The trees had been swept clean, as if by some magical power, and the swarming billions had disappeared.

From whence had they come? Where had they gone to? What was the reason of their coming and their going? Alas! we know not—but that they did come, and did go, in the marvellous way we have related—that we can affirm.

The study of bird life presents to our consideration a field of research which is practically inexhaustible: first, on account of the vast numbers of different species and the great variations which birds exhibit in their habits, etc.; and next because of the difficulty in observing them in a state of nature. The total number of species among the birds known to ornithologists, according to Mr. Seebohm, may be roughly set down at 10,000, * which are distributed among five great families, † spread over the whole surface of the globe, by land and sea. From the summits of the highest mountains to the plain, and from the equator to the poles, the bird is everywhere. The ptarmigan or snow grouse (*Lagopus Mutus*) for instance, is fairly numerous, as far as man has as yet penetrated into the northern polar regions, where it winters amid the eternal snows and finds a home beneath its shelter. There can be little doubt that it

* *The Geographical Distribution of the Family of Charadriidæ*, by Henry Seebohm, 1888, p. 4.

† Approximately as follows:

Anseriformes	1000
Cuculiformes	1900
Passeriformes. . . .	5980
Charadriformes . . .	1100
Struthioformes . . .	20
Total	10,000

See *Ibid.*, by H. Seebohm, p. 4.

goes not only to the pole but all over the North Polar Zone, wherever there is land. Moreover, with the return of spring these desolate regions are alive with swarms of geese and ducks, which go to nest and rear their young in these pathless wilds where they are safe from the intrusion of enemies. All over the widest ocean too, the sea bird finds a home and a resting place upon its stormy billows, where it is rocked in the cradle of the deep, to its nightly rest.

The albatross (*Diomedia Exulans*) for example is continually sweeping over the stormy waves of the great Southern Pacific and Antarctic Oceans. It is undoubtedly the most perfect type of a purely oceanic bird at present existing, and may be met with at the furthermost points from land, bidding defiance to the storm. Here they may be seen sailing with motionless pinions, with greater ease and grace, the fiercer the gale may blow. We have ourselves also noticed many times little birds of the petrel tribe, seemingly hardly larger than a snipe, skimming gaily over the waters quite 1000 miles from land. The broad ocean is everywhere the home of some variety of sea bird. As far as the antarctic regions have been explored, they too were everywhere found to be alive with multitudes of penguins and other fowl. So on the other hand in the driest deserts, where no water is known to be, the sand grouse and the quail, themselves the colour of the sands, seem to thrive where all else is sterility and death, and no doubt they contrive to maintain existence by every second or third day visiting springs, known only to the desert game, which exist among the rocky hills. As for the coasts of desert islands, uninhabited by man

through the intense rigour of the climate, or because there is no fresh water on them, such places literally swarm with sea-birds, their wild wave-beaten cliffs being covered with myriads of these winged fowl, which rest and live amid these rocky solitudes; in some instances in such extraordinary profusion, that the rocks are covered many feet in depth with deposits of guano.

There are a good many instances of this in the antarctic regions, and in desert islands situated far out amidst the southern seas; it is on these latter more especially where the wandering albatross makes her nest, far beyond the reach of human plunderers. * One of the best known of these places is the Hunter group of islands situated some 20 miles N.W. of the Tasmanian coasts in Lat. 40° 23′ S., Long. 144° 58′ E. These rocky islets were discovered by Bass and Flinders so long ago as 1798, and were then covered with immense droves of seals, which lined the cliffs, and disputed the right of way with Bass, when he landed among them. Fighting his way however through the seals, the great circumnavigator at length reached the top of the island, and found its surface covered with albatrosses, sitting on their nests so close together that he had to force a passage through them with his seal club. The island has ever since borne the name of "Albatross Island." Only one visit is known to

* Little is known of the breeding grounds of the albatross, as they only nest in the most isolated and inaccessible places. They are however known to breed on Tristan da Cunha, Prince Edward Island, the Auckland, and the Campbell Islands. There are also immense colonies of the white albatross (*Diomedia Immutabilis*) on Laysar Island near the Sandwich Island group, of which a splendid photograph is exhibited in the South Kensington Museum of Natural History.

have been subsequently made to it, when some guano traders, about 1869, succeeded in effecting a landing; but in doing so they lost their boat, which was dashed to pieces on the rocks, leaving them dependent for subsistence upon the albatrosses, on which they had to live until they could be rescued by their friends.

The whole of this region is a stormy one, where strong winds frequently prevail for weeks together, and on these islands the angry sea dashes up cliffs 60 or 70 feet in height; it also seems there is no permanent supply of fresh water there. Landing is in consequence an operation of considerable risk, as a sailing ship or boat is apt to be carried away by the winds and the strong currents that here prevail, as Bass found to his cost in 1798, when he had great difficulty in rejoining his ship after getting off from the island. In November 1894 however, Messrs. Ashworth and Le Soueff made a special expedition to inspect the breeding grounds of the albatross, known to exist on this historic island; and found some 400 nests of these birds scattered along the cliffs, mostly of the species known as "Diomedia Cauta" or the shy albatross. They contained but a single young bird, or one egg not hatched, size about 4 by $2\frac{3}{4}$ inches, of a creamy white colour, marked at the large end with some red spots. * Those eggs that we have ourselves seen, may be described as somewhat about twice as large as a goose egg, and are rather long and pointed in form; the fact of only one young bird being produced in each nest, which seems hardly ever to be exceeded, will account for the

* See paper read by Messrs. H. P. C. Ashworth and D. Le Soueff at Melbourne, before the French Naturalists Club, Jan. 17, 1895—(Reported in *The Victorian Naturalist*, Vol. xi, No 10 for Jan. 1895, pp. 138—140).

comparatively small numbers of albatross now to be seen in the southern seas, near the Australian and Tasmanian coasts.

It is however still common, in the wide stretch of waters extending from New Zealand to Tasmania, and indeed all over the South Pacific, to see eight or ten of them constantly sweeping in wide circles around the ship. When we crossed these seas the season had been one of an almost constant succession of heavy gales, which blew fiercely without intermission for days together; we therefore had every opportunity of observing their movements during storms at sea—and our distinct impression (recorded in notes taken at the time) was that as if conscious of their power, albatrosses seem very much bolder, and less shy, in storms than during fine weather. We have often passed a considerable time watching them wheeling with motionless wings for many minutes together close behind and alongside of the ship. The flight of the albatross at such times represents the perfection of ease and grace; they seem to sail along without an effort, sometimes almost touching the crests of the waves, descending into the trough of the seas, and out again, with inimitable skill: the next instant sees them perhaps darting away like an arrow from a bow, and soaring to considerable heights above the tempestuous waters: all this being apparently done without a single motion of the wings.

In heavy gales also, we observed them frequently to alight on the sea, close to the ship, as if in quest of food; as in a high rolling sea they have no difficulty in rising from the water, as they run up the last foot or two at the crest of a big wave, and sail

off from its top with the greatest ease, whereas in a calm sea they have great difficulty in rising at all in consequence of the great length of their wings. Albatrosses, we regret to say, are frequently caught by passengers and others, from the decks of sailing ships, by trailing a baited hook astern, which the poor birds dart down upon, and so hook themselves. When brought on board they are, as those who have seen it tell us, generally quite incapable of taking wing from the deck, where they tumble about in a helpless condition, and if not released, soon die.

These birds are said sometimes to follow a ship for days and even for weeks together; and Mr. Gould, the well-known author of many splendid ornithological works of engravings, is of opinion that they often perform the circuit of the globe on the wing; they are said to be both nocturnal as well as diurnal in their flight. In appearance they show an immense stretch of pinion, and fly after the manner of a gigantic gannet, which they much resemble when seen on the wing. In colour they are generally brown on the back and upper side of the wings, but pure white beneath, so that they seem quite a different colour according as they present a view of the back or breast, to the beholder, in their flight.

"The fiercer the gale, the more motionless are its wings, and the more easily does it circle round—and Professor Hutton's theory is that in soaring flight, the wings are inclined upwards, in the direction of flight." * Thus they ascend, much on the same principle as a child's kite; the momentum of their

* Paper read by Messrs. Ashworth and Le Soueff and published in the *Victoria Field Naturalists' Magazine*, Jan. 1895, p. 139

flight furnishing the resistance to the air necessary to carry them up: this in brief may be said to be the substance of Professor Hutton's theory, which though often adversely criticised, Messrs. Ashworth and Le Soueff consider the most feasible explanation yet advanced, and they quote the experiments lately made with Mr. Hiram Maxim's "Aeroplane Flying Machine" (the only machine which has ever actually risen from the ground) as mainly depending on a similar principle; for it is found, they say, that "when the machine is driven on to new air, the inertia of which has not been disturbed, that at high speeds its lifting power is much greater than it was thought to be." *

We have referred at some length to this matter, which we regard as important, inasmuch as it is this same principle which no doubt explains the apparently motionless flight of eagles, hawks, vultures, and other birds of prey, which always sail in circles, in the same way that we have described as being done by the albatross.

From a sportsman's point of view, however, there is another most remarkable feature about the flight of the albatross, which we must by no means pass over in silence. These immense birds are often 8 to 10 feet across the wings, † which are very long and narrow in shape, while the head being carried stretched straight forwards while they fly, reduces the perspective of the bird's outline to the point of a cone: so that when an albatross is seen flying exactly towards one, they become nearly invis-

* Paper of Messrs. Ashworth and Le Soueff, p. 139 (*Victorian Naturalists' Mag.* for Jan. 1895).

† It is sometimes stated in books of travel and voyages that these birds are occasionally seen as much as 16 feet and even 17 feet across the outstretched wings, but this is an evident exaggeration.

ible; and if one was shooting at them present hardly any mark to aim at.* The fact may be readily verified, by anyone watching an albatross circling round a ship, even for a few moments, when it will be seen that as they fly low down near the water, directly towards the spectator, the wings are seen only edgewise, and therefore merely present the appearance of thin lines; while the body consists, apparently, simply of a mere dot seen between these lines; the head and beak, as they point towards him, so completely cover the view of the body, that only this small dot is presented to view, and against a dark wave of blue water at what seems 80 or 100 yards away, the bird is often invisible altogether, in this position. We took special care to note down these facts while at sea, after repeated observation, and were never tired of watching the perfection of grace and ease exhibited in the flight of these beautiful birds.

The wild freedom and complete independence of the sea-bird as it skims over the water has often excited in our mind feelings both of wonder and of admiration. The tempestuous winds that sweep across the ocean, at times with tremendous force and violence, lashing its surface into angry billows, affect it not. On such occasions it is indeed a wonderful thing when one comes to reflect upon it, to find these apparently frail and delicately formed creatures, whom one rude grasp of the human hand would in most instances suffice to crush, are really less affected by the winds

* We venture to appeal to all true sportsmen, to endeavour to prevent shooting at these harmless and beautiful creatures. As if wantonly shot at, or otherwise destroyed, in consequence of their slow rate of reproduction the albatross will soon become almost, or perhaps entirely extinct.

and waves than the most powerful ship which has ever been constructed by engineering skill. As we know the mightiest steamships are all of them more or less dependent upon the weather, not only for the punctual performance of their passages, but also for their security, and in extreme cases, even for their very existence. Whereas the little sea-bird, as it wheels about, seems absolutely to rejoice in the fury of the gale, and can ride in safety, with cork-like buoyancy, upon the crests of the angriest seas.

It has always seemed to us that in the whole economy of terrestrial Nature, there are few, if any finer examples of the triumph of creative skill, in adapting certain forms of life to fill a certain end, than we here see exhibited in the sea-bird's victory over the violence of the storm during exceptionally rough weather. In the great southern ocean, which enwraps the circumference of the globe in that region, we have often noticed during heavy weather flights of tiny birds of the petrel tribe, not much larger than a snipe, as we have said, skimming along the waves as merrily as if the profoundest calm prevailed, while small gulls and other sea-birds, generally not exceeding a pound or two in weight, circled round—over whose powers of movement the fiercest gale has no power at all, either to hinder or to daunt.—And then, compare this on the other hand with steamships of thousands of tons burden, worked by gigantic machinery sometimes tens of thousands of horse power (nominal force) battling with the waves, whose rude blows cause her to shiver all over, like a thing of life in its agony, while its huge frame pitches, and strains, and its decks are swept by green seas from end to end: all these

things we say are striking and wonderful facts which may well cause a man to pause and think even in the midst of the uproar created by the howling of the tempest and the thundering strokes of the seas.

Did time and space permit, many interesting details might be related of the wonderful skill and daring of certain sorts of fishing birds, of which the gannet, or solan goose (*Sula Bassana*) which is common on all the British coasts, furnishes a good example. Without any great stretch of imagination, this class of sea-fowl may be regarded as the eagles or falcons of the ocean, as they swoop down upon their prey, exactly like the falcon. When sailing through the air at a great height above the water, their keen gaze at once detects the presence of fish swimming unconscious of danger near the surface of the waves. Then, watching their opportunity they will suddenly precipitate themselves from on high, and coming down just like a heavy stone dropped from a high cliff into the sea, they dash into the waves and reappear after the lapse of a few seconds with the captured fish.—These birds generally manage to make their swoop with such unerring accuracy that they rarely or never seem to miss their mark,

In the colder regions of Northern Europe, we have also ourselves several times been witness to the still more curious fact of the capture of fish of considerable size in rapidly flowing rivers by a land bird, the "harrier" * (*Circus Cyaneus*), a species of falcon of surpassing strength and boldness. On one occasion at Jock Mock in Swedish Lapland, we saw one of these birds suddenly fall from a great height into the rapids, at the foot

* Sometimes called the "hen-harrier."

of the falls near that place; and disappearing right under water for an instant, he reappeared and flew off with a large fish, which we believe to have been a trout, quite 2½ or 3 lbs weight. We could see the fish struggling and kicking, as the daring bird flew off with his prize over the tops of the surrounding trees.

The feats of some sea-fowl in this respect, of course exceed anything that a land bird could possibly effect, but it is not easy to get near enough to see exactly what is done. It is however quite worth while, and most curious to watch the gannet or Solan goose, fishing upon our coasts, when the modus operandi can sometimes be pretty clearly observed. These birds, like most of the birds of prey, as a rule hunt either singly or in pairs; it is rare to see several acting in concert while fishing. Sometimes however, large companies may be seen assembled on sea-girt rocks, especially during the breeding season; for this purpose the most inaccessible cliffs and reefs are usually selected, where the nests are secure from molestation.

There are five of these breeding stations for gannets in and near Scotland—Ailsa Craig, St. Kilda, Suleskier (marked on most maps as "North Barra"), Stark of Suleskerry, and the Bass rock in the Frith of Forth. *

The numbers on the Bass rock have been computed to be from ten to twenty thousand, and on Ailsa Craig at least as many more; and at these places according to Mr. Robert Gray the extraordinary spectacle of 2000 to 3000 gannets fishing together may occasionally be seen, when as Mr. Gray very truly remarks, "there cannot be a more extraordinary ornithological spec-

* *The Birds of Great Britain*, by John Gould, F.R.S., Vol. v. "The Gannet."

tacle. * Though in general they capture their prey not far from the surface of the water by pouncing upon it from a height, it is also clear that these daring birds do at times descend, by diving, to very considerable depths. Mr. Gray for instance mentions hearing from a boatman, at Ballantrae, "of his having assisted many years ago, in the removal of 128 dead gannets from a train of herring nets, which had been lying at a depth of 120 feet; and as the nets contained a quantity of herrings, it was conjectured that these birds were drawn to them by the sight of their glittering sides." †

Other kinds of fishing birds are the waders and attendants on shallow waters, like the crane, the heron, and the pelican, which seize their prey as it passes in the shallows. Pelicans during the breeding season form large "rookeries," frequented by assemblies of thousands of these birds, generally in trees or thick bush, surrounded by extensive swamps or other wild lands. We have come upon several such places during our wanderings in the North American wilderness. The migration of pelicans (*Pelicanus Onocrotalus*) on the Nile is one of the most curious ornithological sights that it is possible to imagine. Thousands of these great heavy looking birds are then seen assembled together in vast flocks on their journey towards more temperate climates in spring, or else when again returning southwards in autumn. At these times they may be seen, settled for rest in the evenings on sandbanks in the middle of the river, exactly like a regiment of white soldiers formed in column, most of the birds asleep, but each company guarded by alert sentinels with head erect, watching

* *The Birds of the West of Scotland, etc.*, by Robert Gray, 1871, p. 460.
† *Ibid.*, p. 460.

for the smallest symptom of danger. The great mud flats of Lake Menzaleh, near the entrance to the Suez Canal, is a celebrated place for them, and we have seen pelicans in enormous numbers, thus assembled, covering many square acres of ground, and presenting a magnificent appearance; some standing spread out in long white lines extending for hundreds of yards like regiments of soldiers, in some instances so closely packed that in the distance they seemed a solid mass resembling a bank of snow. Others again scattered over the water, upon which each bird floats, forming one of an infinite number of detached grey dots, rising upon its surface. * Here and there also, along the shores of Lake Menzaleh, may often be observed considerable flocks of flamingoes (*Phoenicopterus Roseus*) standing in the shallows, which by their superior height and colour are easily distinguished from pelicans. The flamingo is a peculiar ornithological resident, rarely or never absent from the lake, where they breed in very large numbers; their nests consisting merely of a round heap of sandy mud, raised a few inches above the water. † This bird is a habitant of saline lakes and other stagnant intensely salt waters.

The indication therefore, which the presence of the flamingo affords to travellers in unknown regions, is that of the certain existence of saline districts in the neighbourhood: thus all over Northern Africa, the flamingo is a visitor to the salt lakes, which are there found in large numbers, and some of which cover a considerable area, on the southern slopes of the

* When the bird is swimming the white parts are mostly concealed from view, and the birds look grey.

† Specimens of these birds and their nests are shown in the South Kensington Museum of Natural History, London.

mountains which stretch along its northern seaboard. So also in the Pampas region of South America, near similar waters, we have seen immense flocks of these curious and beautiful birds, the moral to be drawn from whose presence was we believe first pointed out by the late Mr. Charles Darwin, in his "Voyage of a Naturalist."

"I met (he tells us) these birds wherever there were lakes of brine" (in South America near the Patagonian frontier). "In these lakes the mud in many places was full of worms. I saw them (the flamingoes) wading about in search of food, probably for the worms that burrow in the mud. Thus, we have a little living world, within itself, adapted to these lakes of brine.—Well may we affirm that every part of the world is habitable; whether lakes of brine, or those subterranean ones, warm mineral springs; the wide expanse and depths of the ocean; the upper regions of the atmosphere, and even the surface of perpetual snow; all support organic beings." *

It is generally supposed by persons who have never thought of looking into these matters, that these briny waters (of which the Dead Sea affords a good example) are incapable of supporting life. Here therefore we have a direct refutation of this error; and not only so, but scientific researches show that the most concentrated saline solutions contain myriads of minute organisms which there live and flourish. Thus in the brine pans of the salt works at Lymington (England) a minute crustaceous animal lives in countless numbers, but this creature is found in those waters, only when the fluid has been evaporated to a con-

* *A Naturalist's Voyage Round the World*, in H.M.S. *Beagle*, during the years 1832 to 1836, by Charles Darwin, 14th Edit. 1879, p. 67.

siderable degree of strength, "*viz.*, to a quarter of a pound of salt to one pint of water." *

Now, in many of the natural saline lagoons, found in different parts of the world, this is exactly what occurs: the concentration of salt becomes very highly developed by the evaporation caused by the solar rays; when this reaches what is technically known as the point of saturation the water becomes no longer capable of holding the whole of the salt in solution, any surplus then gradually becomes deposited in a more or less pure form of natural salt: in some places these deposits have been known to thus form beds of this nature many feet in thickness, and of a very good colour: so far however as our own experiences have gone, for we have often tried it—it is seldom good tasted salt: that is to say the chloride of sodium (or table salt) is mixed with other salts, such as magnesia, etc., which impart a disagreeable flavour, and also produce a purgative action. All these however, open up a variety of matters of technical detail, which cannot be considered here.

The question of the migration of birds, to which these great assemblages of pelicans have insensibly led us, is one of very great interest and importance; well worthy of the attentive consideration of all sportsmen and lovers of Nature.—These matters have before been touched upon in various parts of this work, but more particularly in our arctic section. We must therefore at present confine any further observations upon the subject within as narrow limits as possible; but we think a chapter upon Wildfowl and Wildfowl

* See Linnæan Transactions, Vol. xi, p. 205, quoted by Mr. Darwin in his *Naturalist's Voyage*.

Shooting, would be singularly incomplete without some further mention of a subject so intimately connected with every phase of it as that of migration.

Most of the birds which furnish sport to the wild-fowler's gun, or enliven the neighbourhood of our English groves and hedgerows with the voices of feathered songsters, are migrants, which have no permanent abiding place upon our shores.

This we say not only with regard to birds of a notoriously migratory disposition, but also as respects most of our feathered friends, whom we justly regard as permanent residents of our farms and gardens, because under stress of weather of phenomenal severity—they also take wing; and fly away to more hospitable shores, where the rude hand of winter presses less hardly upon them.

An instance of a wholesale migration of this kind occurred during the severe winter of 1878, and we refer to it more particularly because we happened to be in the country at the time, and can therefore state from personal observation the fact of the almost complete disappearance of small birds during that winter: and many of them did not return till well on in the spring of 1879. Hares also turned more or less completely white as in Russia, a thing that had never before been noticed in that part of the country by the oldest inhabitants. *

This unusual migration of the feathered tribes known to be permanent habitants goes far towards establishing the fact, that all birds are endowed with a certain amount of this migratory disposition, and that it only

* As per observations made and recorded at Hilton Park.

requires a temporary stress of abnormal weather to call it into active operation. In the severe winter of 1894—5 migrations of these birds were, we understand, again repeated; we can all of us well understand that driven by want and the severity of the cold, they would attempt, if possible, to seek a less rigorous climate pending the return of milder weather: but what is astonishing is how birds who do not habitually migrate, can instinctively find their way towards the south when necessity impels their flight; the loss of life is probably however enormous. The most competent observers believe the mortality caused by bird migrations to be always very great, even among those species which habitually roam the furthest, and which as a rule follow regular lines of flight. These great flight lines generally follow the general direction of coasts, or the paths of great rivers and streams, which serve more or less as guides to point out the course to be followed; but these safeguards, the result of instinctive experiences acquired by many generations of previous migrants, are wanting in the case of the casual migrant. That the sufferings of birds were very great, during the return migrations in the spring of 1895 (after the sallying forth during the great frost that laid its hand upon Europe generally, during the two first months of that year), there can be no doubt: as we happened to be returning from the eastward at the time, and especially noticed the number and variety of the poor birds that sought refuge upon the masts and awnings of our ship, both in the Red Sea and in the Mediterranean. These birds which were doubtless migrants which had lost their way consisted of swallows, finches, starlings,

doves, pigeons, and one or two species of European water birds. We carried doves, starlings, and grey water wagtails from near the coasts of Egypt to Brindisi: they used to come and feed upon crumbs and other substances dropped about the decks close to the feet of passengers.

There remained the difficulty as to water, as some of these birds (*viz.*, one dove and a pair of wagtails) stuck by the ship as far as Malta, and were we believe the same that originally accompanied us from Egypt. There was a place where no doubt plenty of fresh water could have been obtained, had they known of it. But we never could see that they visited it. In that case an interesting question arises as to how these birds could exist without water. We can have no doubt, however, that enough could be obtained from the precipitation of drops of dew upon wire ropes and other ironwork to furnish them with a sufficient supply. In the early mornings, almost everywhere at sea, this deposit of fresh water takes place, and would furnish sufficient sustenance for a number of little creatures like these birds; we can have no doubt that it is in this way, in dry desert regions, that many birds manage to sustain life, when to all appearance they are entirely bereft of water. There are certain regions, it is true, where for long periods there is no dew; in large portions of South Africa this is so during January, February and part of March; that is to say there is no apparent dew, and a man can sleep out all night without the least appearance of damp settling upon him. But in most desert regions, dew falls during the greater portion of the year—in Central Australia for example, in a perfectly waterless district,

Captain Sturt, the explorer, probably saved his life by collecting the dew drops from the bush by means of a sponge.

It is in this way, we cannot doubt, that many birds obtain their supplies of water. A remarkable instance of how they sometimes manage to collect sufficient water to assuage their thirst is mentioned in Forrester's "American Field Sports," in the case of a caged prairie hen. It was remarked that she avoided the cup of water placed for her in the cage. "Happening, however, one day to drop some water on the cage, it trickled down in drops along the bars, which the bird no sooner observed than she eagerly picked them off drop by drop, with a dexterity that showed she had been habituated to this mode of quenching her thirst, and probably it could be done in this way only in dry and barren tracts, where, except in the form of drops of dew and rain, water is very rarely met with." *

This incident shows very clearly how the thing is done, and describes in brief the manner in which it seems certain that many birds inhabiting dry regions supply their wants. Where strong frosts however supervene all waters are sealed up, and everything becomes like iron: nothing therefore remains for it in the case of birds which pick up their food bit by bit, mostly in a soft state, but migration. Many birds of the duck tribe for instance require to take their food either in water or else in a very moist state; such birds are best fed while young, if being reared by hand, by placing their food in shallow pans, covered with water, thus most nearly approaching their natural habits. If it is given to them

* Frank Forrester's *American Field Sports*, 1852, Vol. i., p. 61.

in a dry state, they soon die.* It is therefore easy to see how impossible it would be for such aquatic fowl to remain in a district where the springs were sealed by frost. In our own land they can however always betake themselves to the sea coast, and so obtain both food and water; but this cannot be in the heart of a great continent like Asia, or North America, where the northern seas themselves become ice-bound, and where the land for vast distances in every direction is converted into a perfectly dry field of snow or ice. It is therefore clear that the only resource is a flight towards the south.

This therefore evidently explains the motive cause of the vast migrations of fowl which take place from the polar regions during autumn, in both these continents: while the return flights of these migrants in spring are the result of the natural impulse which causes them to seek the land of their birth and assemble in multitudes at their breeding grounds in the far north the moment the break-up of the ice releases the waters from the winter's bonds. We have gone into the subject of these great migrations to and from the circumpolar regions with some detail in our arctic section, and have there stated the reasons which lead us to believe that the whole of the polar wilderness is used by various kinds of birds as a nesting place on account of its security from the interference of enemies while rearing their young. This view is supported by very high authority of which we shall here quote merely a single example:

* These pans should be quite shallow, say not exceeding about half an inch in depth, and the water should just barely cover the food. They should be used in the cases of all aquatic birds, ornamental water-fowl etc., when reared by hand.

"It is highly probable (says Mr. Wilson, the American ornithologist) that they extend their migrations to the very pole itself, amid the silent desolation of unknown countries, shut out since Creation from the prying eye of man by everlasting and insuperable barriers of ice and snow. That such places abound with their suitable food, we cannot for one moment doubt; while the absence of the great destroyer, man, and the splendour of a perpetual day, may render such regions the most suitable for their purpose." *

The incredible numbers of aquatic fowl of all kinds that join in these migratory flights, in addition to the various land birds which likewise seek these far northern nesting grounds, altogether surpass anything that we can form an idea of when we reflect that the most prodigious flights as yet recorded by observers merely give an account of what occurs at a few isolated points; whereas countless flights of a similar character, which are unseen and unrecorded, are annually going on throughout the whole circumference of the Northern Hemisphere, while those that take place in the antarctic regions have of course never been witnessed, or taken account of by man at all, for of those vast frozen wastes we know practically nothing whatsoever. Many of the great migratory flights in the northern circumpolar regions moreover, keep out to seaward, some of them perhaps in mid ocean, while others keep the coast line in view, as a directing point where headlands jut out into the sea. The inland flights, so far as can be judged, usually guide their line of flight as we have said by the courses of great rivers which run north and south, like the Nile and the Mississippi.

* Quoted by Mr. Robt. Gray, in his work on *The Birds of the West of Scotland, and the Outer Hebrides*, publ. 1871, p. 354 (Article "The Canada Goose").

Along the vallies of both these rivers accordingly numerous and extensive flights of various kinds of migrants steer their course. * We have had opportunities of observing these flights on both these rivers, and as a young man have waited for the wildfowl on a celebrated "Duck Pass" in an extensive swamp near New Madrid, in the State of Missouri, on the Mississippi. Here the sport at that time (about 1860) was magnificent, and a sportsman could fire practically as long and as often as his shoulder would stand the recoil of his gun, and could kill ducks and geese of almost every kind which visited those regions.

Professional hunters for supplying the markets of St. Louis and other large towns, at that time used annually to watch for the flights as they passed along this great swamp in autumn, and used to kill immense numbers of all kinds of fowl. We attached ourselves on the occasion to which we refer to a party of these men, who intimately knew every yard of the ground, and were by them received as a welcome guest, on terms of handing over to them at the end of the day the birds we did not want for our own use. This we were quite willing to do in return for the magnificent sport thus obtained, and the valuable help and information these men were only too happy to afford. We used to be at our stands, on dry islets in the middle of the swamp, before dawn, and from that time and for several

* Mr. Leffingwell for instance states that the wild pigeons annually flew up the valley of the Mississippi, following the river in its windings, in their migrations to their nesting grounds, in such immense flocks that "to one who has never seen wild pigeons in their flight, neither the tongue nor pen can show its beauties, for when they skim over the ancient trees the air is alive with flitting colours: the world is on the move and the very sky is filled with gladness (*Shooting on Upland, Marsh, and Stream*, by W. B. Leffingwell, 1890, pp. 218 to 224).

hours afterwards, there was a constant succession of flight after flight of various kinds of birds, all winging their way to the southwards, and flying quite low; in fact just clear of the stunted swamp timber. At times it was impossible to load fast enough with the old muzzle-loading guns, to take all the shots that came within easy range, and by midday all hands were glad enough to return to the hospitable shelter of the log cabin, hungry, half frozen, and with shoulders sore from the constant firing. A heavy double shoulder gun charged with BB, or other mould shot, was generally kept in reserve for geese—which could generally be heard approaching like a pack of hounds in full cry, long before they came into view. The best time was always just when it was barely light enough to see to shoot. When it became clear daylight the birds were apt to see the shooter unless he kept very close under cover. Small blinds had therefore to be erected to mask the gun.

On the Nile the great migratory flights consisted mostly of the black and white stork (*Ciconia Alba*) and the great pelican (*Pelicanus Onocrotalus*). But there were also many geese (*Chenalopex Ægyptiaca*) and other waterfowl. The passage of the countless myriads of storks passing overhead at enormous altitudes, almost without intermission for several hours together, constituted what we must describe as one of the most wonderful ornithological spectacles we have ever witnessed. It was between the First and Second Cataracts that we saw them. At these great heights many of them appeared like mere specks floating in the expanse of the heavenly blue—but an examination with a good field glass placed their identity beyond

a doubt, and showed that each of the dots passing in the zenith was a stork, whose expanded wings probably measured something like 4½ to 5 feet from tip to tip. The air was thick with them, and there must have been tens and possibly hundreds of thousands in each of these flights, all proceeding northwards from the Soudan towards Northern Egypt, and other countries in Asia Minor and parts of Europe. Flight succeeded flight at short intervals in this manner for the greater part of two days. Further down the river the pelicans also came along in large numbers, but flying at lower altitudes than the storks.

The migration of these great birds upon the Nile seems to us to take rank among the most interesting problems of avian season flight, as on account of their great size they are always visible in clear weather during daylight, with the aid of good glasses, no matter how high they may fly. It would be well worth while for skilled observers to station themselves, say at Wadi Halfa, near the Second Cataract, and Philœ, at the First Cataract, during the months of March and April, and perhaps during part of May, to observe them. The margins of Lake Menzaleh would be another good standpoint of observation. Photographs could be obtained which would place on record a good representation of these great flights, which would be beyond the reach of supposed exaggeration. They occur annually in spring and autumn, at intervals, for periods extending over some weeks; though it is probably only on particular days that such vast flights as those we have endeavoured to give a very inadequate description of, are visible: but our stay was short,

and we cannot speak positively upon this point. We must however point out that persons not accustomed to watch the sky overhead, might quite possibly be on the ground and miss seeing flights passing at great altitudes at all: unless a man looks up, it is quite conceivable that many great companies of birds might cross the zenith unnoticed. The importance of this subject will we trust be sufficient to warrant a short digression from our narration to enable as to consider it. We have Mr. Darwin's authority for stating that an ordinary observer in a level country will seldom notice objects in the air at a greater elevation than 15 degrees above the horizon—such for instance as vultures, which were the objects of Mr. Darwin's remark when he made this statement. * He therefore considers that a vulture 3000 or 4000 feet overhead would not come within the range of vision, unless he were more than two miles off. In our own humble way, we have no hesitation in supporting this assertion of Mr. Darwin's: it has been constantly within our own experience that we have had to point out things, in the higher atmosphere, to persons who were not trained to observe them, and who would never have seen them at all if they had not been pointed out. A good instance of this may be found in the way people let themselves unintentionally be caught by showers, when it is quite easy to obtain shelter in time to avoid them. We well remember how on one occasion some years ago, during a meet of coaches in Hyde Park, when a vast

* *Journal of Researches in Natural History and Geology during the Voyage of H.M.S. Beagle* (1832 to 1836), by Chas. Darwin, 12th thousand 1873, pp. 185 and 186.

concourse of people was assembled, a heavy thunder shower broke over them. We pointed out the approaching storm, but people would not move; and the destruction of ladies' dresses on that morning, by the subsequent downpour, must have represented something very large: some thousands of handsome dresses, etc. must have been entirely ruined. Yet nothing would have been easier than to get away in time to have avoided all this; it was too late when the first drops began to fall, and the general stampede took place.

The object of these observations is to lay stress upon the necessity for trained observation of the phenomena of the atmosphere: the paucity of accurate detail obtainable about the question of the migratory flight of birds, affords a good instance in point. Most of them pass unnoticed and unseen. How many people can say that they have witnessed these wonderful flights? There are several reasons for this. The flight of many migrants is conducted at such great elevations, that they are only imperfectly visible from the earth beneath; others no doubt actually do pass beyond the range of human vision: we can have no hesitation in asserting that this is so, especially in the case of small birds.* Many migrations also occur during the night, when it is only the distant notes of birds, passing high in the zenith, heard at intervals in the prevailing stillness, that dis-

* Many reasons have been quoted to account for the great heights at which the migration flights of birds are often conducted: Personally we believe that the atmosphere at these altitudes is found to be much calmer than nearer the earth's surface, and the migrants thus pass above the reach of storms which are so liable to occur at lower levels. During heavy gales the cirrus clouds at great altitudes are for instance, often to be seen floating apparently motionless, when the lower strata of cumulous clouds are passing with great velocity beneath.

close to the ears of human watchers what is passing overhead. But over and above all these cases, there must still remain vast numbers of instances, where these flights escape observation, even of persons fond of natural history, simply from want of practised habits of observation on their part. Like the swiftly passing cloud drift, which may be seen passing overhead hour after hour, in plain view of everybody, which warns us of the approach of a serious gale, these things are mostly not seen at all. The gale suddenly bursts upon the astonished observer, and people meet each other and remark: "How very sudden! What a changeable climate ours is!" Yet almost always, the coming up of a considerable atmospheric disturbance, is under ordinary circumstances plainly visible for some hours beforehand: if people only made it a habit to look upwards occasionally, and observe the signs of the heavens. This we have no hesitation in positively asserting, after long years of patient observation. *

Sportsmen especially ought to exercise a constant vigilance in wild countries, upon the movements of birds of prey seen hovering often at very great altitudes overhead: as these birds are almost certainly watching the movements of game, or of human beings, within sight of them beneath. Hunters are often directed to the whereabouts of dead or wounded animals in this way. Hawks, and the smaller birds of prey, in like manner, are watching for the reappearance of

* Observers should by no means be discouraged, because every such disturbance of the cloud regions is not always followed by the expected gale, because atmospheric disturbances are often deflected through natural causes, such as eddies of wind *upwards* into the regions of space, where they of course expend their forces, unfelt upon the earth below.

some bird which they have caught sight of, and which has hidden itself from view.

Then again the flights of birds to and from water, often afford the most valuable information as to the directions in which streams and other waters are to be found. Aquatic fowl almost certainly indicate the presence of rivers, or considerable sheets of water. In hot climates the flights of these birds are also very frequently conducted at a great height above the earth—where the birds obtain the advantage of the cooler atmosphere of the great altitudes. All these, and similar signs of the wilderness, have, however, been noticed more particularly elsewhere in these pages, and our only object in again calling attention to them here, is to demonstrate more clearly the value, and indeed the necessity of watching the sky concurrently with the landscape.

Before we turn away from the subject of bird migrations, we desire to notice the movements and assemblages of certain sorts of game birds, which take place mostly in the great forest regions, or which seek the cover of the timber in partially wooded districts.

The most remarkable of all these birds is probably the pigeon. Various species of pigeons are to be found scattered practically over the whole habitable surface of the globe, of which at least 500 species have been described by ornithologists.*

We have a very fine example in the wood-pigeon or ring-dove (*Columba Palumbes*) of our own country, one of the best game birds for table purposes, we have always thought, that flies—though we are quite aware it is not a fashionable bird in the bills of fare

* *Encycl. Brit.*, 9th Edit., Vol. xix., p. 35 (Art. "Pigeons").

of great dinners. Still roast wood-pigeon, with bread sauce, if some of our readers will give it a fair trial, we think they will be constrained to admit, is at all times, *excellent*. On account, however, of the exceeding wildness and wariness of this bird, it taxes the ingenuity of the keenest sportsman to get wood-pigeons, when he wants them: and yet the wood-pigeon is one of those birds that is always with us, which we have already noticed, as a follower of the plough, and a dweller in the vicinity of human habitations.

Wherever there is plenty of cultivation, with belts of wooded country in the vicinity, there the pigeon makes itself at home, and builds its little platform of sticks, to form its rude nest, in the forks of the highest trees, or in the recesses of the thickest groves, As a boy, we have often watched the fir plantations in spring time, near the home of our ancestors, to find these nests, and when the parent bird flew panic-stricken out from among the branches above our heads, we have climbed up and found it there. Young wood-pigeons, just before they are strong enough to fly away, are excellent; and as the destruction the old birds do to gardens etc., is very great, we never had any hesitation about marking the place, and returning in the nick of time to effect the capture of the poults, if they were not ready to take when the nest was first discovered. The young birds may have a piece of string attached to one leg, and this passed through the nest and made fast prevents them flying off too early, without in any way hurting or injuring them.

We have found the best way of shooting wood-pigeons is to wait for them under the trees, where they go to roost. These are easily found by watching their move-

ments about sunset. It is necessary to be there before the birds begin to arrive, and when one alights overhead, to remain for some minutes perfectly motionless until the watchful bird has taken his survey of the neighbourhood: pigeons always do this the moment they alight, and if the sportsman makes the slightest motion he is at once detected, and the bird in nine cases out of ten is off before he can get a shot. When his scrutiny is satisfied, the gun should be slowly raised, and he can then be easily shot on his perch.

"Pigeons (says Sir Ralph Payne-Gallwey) always prefer the sheltered side, and roost away from trees exposed to the wind. Never fail to stand with your back to the wind, as pigeons surely fly in to roost with backs to the wind. During a gale is the best time of all others to kill birds." He advises the use of wooden decoys, which can be purchased from dealers in sporting appliances. "Insist (he says) on their having glass eyes of a correct colour, this is of great importance. Fix them on poles, a foot above the topmost twigs of a tree, and a yard or so apart. Three are enough. If they are not secured fair and level, wild birds will not visit them." * We have no experience of this plan, but fear where the trees are large and high, difficulty would arise in fixing the decoys. The other hints are good; generally however birds sit breast to the wind. The wind then cannot ruffle up their feathers nor obtain admission to their skin—whereas obviously, where a bird sits in a strong wind with

* Extracts from *Letters to Young Sportsmen*, by Sir R. Payne-Gallwey, 2nd Series, Letter 2, published in "The Field" of September 25th, 1891.

his back to the wind, the wind would blow his feathers about. Therefore, so far as we can express an opinion, our experience is, that all birds perch or float upon water, facing the wind, when it blows strongly. Their heads are then turned in for shelter during sleep beneath the wing. As regards the advantage of good decoys, in many kinds of bird shooting, there can be no question, where they can be fixed in a natural attitude. This is well seen in duck and goose shooting, and no doubt the same plan would prove valuable to attract pigeons also.

In Wilderness hunting the pigeon is a most useful bird: in the first place wherever there are copses or belts of timber along streams, it is found everywhere. Pigeon shooting in Africa is capital. The following for instance is extracted from a recent work on the Congo Free State. "Good shooting can be had every morning from April till October at the green pigeons, which collect in flocks of from 50 to 100 or more. They are very plump and fat and excellent eating. They are in my opinion, without doubt, the fastest flying pigeons I have ever come across, and take good shooting to make anything of a bag." *

In the middle of great forests also, the pigeon is one of the few birds which seem to make a home amid the dense wilderness of trees (where they feed upon berries and mast). Here they are always to be found in sufficient numbers, and under circumstances which enable the hunter to recruit his larder from their ranks. There are of course doubtless many other birds, but their numbers are often apparently so few, and their habits such, that it is difficult to make a bag of them. The marvellous

* *Travels, etc., in the Congo Free State, and its Big Game Shooting*, by Bula N. Zau, 1894, p. 28 (written by Mr. Henry Bailey).

tales of the vast flights of pigeons that used to be seen in North America a generation or two ago, seem now-a-days almost to pass the bounds of credibility were it not that they are recounted by such undoubted authority.

This pigeon (*Columba Migratoria*), "the passenger pigeon" of American ornithologists, unfortunately was an instance of the wilderness tribe which shuns the society of man, so that now-a-days it is comparatively scarce and rare. It was one of the most beautiful of all the pigeon tribe; all the colours of the rainbow being exhibited in the highest perfection on its glossy plumage. These were principally shades of grey, bronze-green, purple-green, and colours like that of the opal. Great accounts of the wonderful American pigeon-roosts of former days are to be found in Wilson's American Ornithology, * and other works. We must however confine ourselves to a few short specimens of such cases, extracted from recent books; but we may mention that we have ourselves seen enormous assemblages of these birds; consisting of flights which, without exaggeration, may be said to have literally darkened the sky during their passage; and where some of these flights alighted upon a farmer's field, as the settlers expressed it, as they rose again it looked as if the field itself was taking flight. † One of the accounts

* See *American Ornithology*, by Alexr. Wilson and Prince Charles Lucien Buonaparte, Edited by Sir Wm. Jardine, 1876. Vol. ii, pp. 195 to 209—("The Passenger Pigeon.")

† A couple of centuries ago they swarmed in such vast numbers and committed such ravages upon the French settlers' crops, near Montreal, in Canada, that it appears the Roman Catholic bishop of that place went out to exorcise them, with Holy Water, as evil spirits: this is gravely related in an ancient book of French travels (*Voyages du Baron De La Hontan dans L'Amérique Septentrionale*, Vol. i, pp. 93 and 95. Amsterdam 1705).

which we desire to place before our readers as a record of the mighty swarms of these pigeons, is that supplied by Professor Roney respecting what is said to be one of the largest pigeon-roosts ever recorded in the United States, which occurred at Petoskey in the State of Michigan in 1878. The Professor went to the place with a view of protecting the birds, so far as that was possible, and his report states:—

"It (the roosting-place) was estimated by those best qualified to judge, to be 40 miles in length by 3 to 10 miles in width, probably the largest nesting that ever existed in the United States, including not less than 150,000 acres within its limits (that would represent an area of just 250 square miles, as 150,000 : 640 = 250). Every bough was bending under their weight, and they were so tame one could almost touch them. Scarcely a tree could be seen but contained from 5 to 50 nests. There are in the United States about 5000 men who pursue pigeons year after year, as a business. The first shipment of birds from Petoskey was upon March 22 (1878), and the last on August 12, making over twenty weeks that the bird killing was carried on. We find the shipments to have been 12,500 dead birds daily—or 1,750,000 for the season. Of live birds there were shipped 1116 crates—six dozen per crate, or 80,352 birds. These were the rail shipments only, and were not including cargoes by steamers which were as many more: added to this were (many private lots, quantities unknown) and the thousands of dead and wounded, not secured, and the myriads of squabs dead in the nests by trapping the parent birds. We have at the lowest possible estimate 100 millions of pigeons sacrificed during the nesting of 1878." *

Wilson the American ornithologist gives another very similar description of a great "Roost," as the

* *Shooting on Upland, Marsh, and Stream* (in the U.S.), by W. B. Leffingwell, 1890, pp. 220 to 235.

Americans call it, near Selbyville in Kentucky, which occurred about half a century ago; the birds made their appearance at it about the 10th of April, and left with their young before the 25th of August. As soon as the young birds were fully grown, parties of people arrived from all parts of the country, and encamped near this immense nursery.

"Several of them informed me (says Mr. Wilson) that the noise in the woods was so great, that it was difficult to hear another person speak. The ground was strewed with broken limbs of trees, eggs, and dead squab pigeons, which had been precipitated from aloft. From twenty feet upwards to the tops of the trees, the view presented a perfect tumult of crowding and fluttering multitudes of pigeons: their wings roaring like thunder, mingled with the crash of falling timber: for axe-men were at work, cutting down those trees that seemed most crowded with nests, and they contrived to fell them so that they might bring down several trees. On some trees were upwards of 100 nests, each containing one young one only. It was dangerous to walk under these flying and fluttering millions, from the frequent fall of branches, broken down by the weight of the multitudes above; which in their descent often destroyed numbers of the birds themselves, while the clothes of those engaged in the woods, were completely covered with the excrement of the pigeons." *

Such were some of the wonderful scenes of bird life, visible in the great American forests, within memory of persons still living. The pigeon flights in New Brunswick, according to Mr. Wilson, used during June and July to darken the air for days together. These deplorable scenes of waste and slaughter are

* *American Ornithology*, by Alexr. Wilson and Prince Charles Lucien Buonaparte, Edited by Sir Wm. Jardine, 3 vols. 1876 (see "The Passenger Pigeon," Vol. ii, pp. 200—201).

however at an end; for in 1890, when Mr. Leffingwell's book was published, this race of beautiful birds, the Passenger Pigeon of the United States, was so greatly reduced in numbers, as to be to all intents and purposes nearly extinct. The question therefore, that might easily arise in the minds of all who read the foregoing, would be "Was it these massacres of young birds, and destruction of nests, that has nearly exterminated this pigeon?"

To this we should be inclined to reply, that while it is of course difficult to assign any positive cause for the vast diminution of the numbers of this bird in the United States, we can hardly think these butcheries of the squabs, as they are called, could account for it; because it must be evident that if many were killed, many also survived and escaped: therefore, we believe, some other cause must be sought for, to account for the annihilation of the whole race.

This cause, we consider, will more than probably lie in the destruction of the forests themselves, by axe and fire. To the latter cause alone, the destruction of hundreds and even thousands of square miles of primeval forest by one single fire, has more than once been recorded. * The passenger pigeon was a bird of wild and migratory disposition which (as we have already mentioned) shunned the neighbourhood of human society, probably because its principal source of food was found only in the primeval woods and wastes of Nature: consequently, the destruction of the forest and the

* Instance—The great Miramichi forest fire of 1825, in New Brunswick, stated to have extended over an area of nearly 6000 square miles, on both sides of the river of that name; for at least 100 miles on each bank it destroyed everything, including towns and villages: more than 600 persons perished in the flames (See *Echoes from the Back Woods*, by Capt. R. G. A. Levinge, 1849, Vol. i, p. 41).

spread of population over the plain, may have in itself sufficed, to render the United States no longer suitable to maintain the wild race, which have therefore gone the way of the Indian and the buffalo.

Among other wild birds, habitants of the North American woods, that in like manner shun the vicinity of man, according to Frank Forrester, may be enumerated the wild turkey, the pinnated and ruffed grouse, and the spruce partridge: all these he says, "unquestionably do make their home in the wilderness, the last-named there exclusively." * These latter varieties are habitants mostly of mountainous regions covered with scrub bush forest, near the snow line, or of the dwarf tree-covered tundras of the Sub-Arctic and Arctic Zones. The wild turkey (*Meleagris Americana*) however, may justly be regarded as the queen of American game birds. In former days it was very numerous and its geographical range extended over an immense area in North America; extending in fact from Canada far down into the tropical regions of Central America. This bird was one of the good gifts reaching us from the Western Hemisphere, all our present races of domestic turkeys having been originally imported thence: a fact which is preserved in a corrupted form in the French word "*Dindon*"—the original term for "turkey" in French, being "*Poule D'Inde Don*," a "fowl the gift of the Indies," since corrupted into its present shape "*Dindon*." † In almost

* Frank Forrester's *American Field Sports*, 1852, Vol. i, p. 14 (this was the *nom-de-plume* of Mr. Henry William Herbert, an acute and most painstaking observer of the natural history and wild game of his country).

† In our own language, the curious name of "turkey" has nothing to do with Turkey or the Turks, but proceeds from its call note, "Turk-Turk-Turk" by which this bird may be said to have named itself. (See *Encycl. Brit.*, 9th Edit., Vol. xxiii, p. 657.)

all the ancient accounts of the New World which have been transmitted to posterity, the wild turkey is spoken of with admiration.* Everywhere it seems to have existed in great abundance, and personally we are inclined to regard it as more properly speaking a habitant of tropical regions rather than of the temperate zone: because the finest and heaviest birds are always met with within, or near, the tropic. For instance on the authority of Colonel Dodge the weight of the wild turkey in the U. States is put at from 20 to 25 lbs, and as regards its abundance in former days, this officer mentions that being one night encamped near an immense turkey roost, in Texas, four or five of his men, armed only with very inferior weapons, bagged 82 birds in a couple of hours. On another occasion a soldier bagged 26 from one tree without changing his position.† But unfortunately the dates of these events are not given, nor are any details given of the size or weight of the birds.

Now, as regards the comparative weight of wild turkeys in the United States and warmer lands, we have no hesitation in asserting that in Mexico and other tropical parts their average weight must be considerably greater than in the United States, generally speaking. Captain Townshend for instance states that in Florida, a State possessing an almost tropical climate, their weight is frequently from 30 to 50 lbs, and he mentions having himself bagged one which

* See for instance *La general Natural Historia de las Indias*, por Don Gonzalo Fernandez de Oviedo y Valdez (1478—1557), Published 1527, Cap. xxxvi.

† *The Hunting Grounds of the Great West*, by Col. Richd J. Dodge, U.S.A., 1877, pp. 23—27.

weighed over 40 lbs. while another shot by his companion weighed nearly 50 lbs. *

There can be not doubt that 50 lbs is a great weight for a single bird, and that such a bird must be an altogether exceptional example; nevertheless we think we have had a bird in our hand, killed near Tampico in Mexico, which could not have been very much less than that, though there were no means of weighing it at hand. The weight of these birds however, depends greatly on age—old cocks being far the heaviest; and certain it is, so far as our observations go, that the turkey thrives better in or near the torrid, than in the temperate zone. † Everywhere however it is one of the wildest and wariest of birds, and is rarely seen very far from heavy jungle, or forest: indeed it merely leaves the shadow of the trees for the purpose of feeding, and makes back at once to the heaviest cover, on the slightest symptom of danger. The wild turkey may therefore be distinctly classed as a regular denizen of the forest (of the edges of the forest that is) as it invariably returns to its coverts to pass the night.

Turkeys are very hard to get near by day, and it often taxes the ingenuity of the smartest woodsman to circumvent an experienced gobbler.

"All his senses (says Colonel Dodge) are exquisite: and in sense of smell, he is scarcely equalled by the elk."—

* *Wild Life in Florida*, by Capt. F. T. Townshend (2nd Life Guards), 1875, pp. 75—293.

† This sub-tropical and tropical variety of the wild turkey is known among ornithologists as the *Meleagris Mexicana*, which in England is generally regarded as the ancestor of the Cambridgeshire breed of turkeys. The turkey is supposed to have been introduced into Europe by 1530. The first mention of it in England was in 1541 and by 1573 it had become an item of Christmas "husbandlie fare" (See *Encycl. Brit.*, 9th Edition, Vol. xxiii, pp. 657—8).

"When, therefore, this game is wild it requires no little skill to bag him without a dog especially trained. The hunter must work on foot against the wind, cautiously pushing his way without noise. If he is discovered, the turkeys silently disappear in the cover, and the hunter knows only of their vicinity by seeing their tracks. If however he succeeds in approaching near enough for a shot, the explosion of the gun throws them into a panic of which the knowing hunter will take the fullest advantage. Some will fly up and alight in the nearest trees; some will squat where they are in any little cover that promises protection." *

Colonel Dodge goes on to explain, that by taking the first shots at those in the trees, and afterwards walking up those that remain hiding upon the ground, a flock of 20 or 30 turkeys will under such circumstances sometimes yield six or eight birds to a good hunter.

It is however not often that so favourable a chance as this will be hit upon; and a man generally has to work pretty hard to get even a single good specimen of the wild turkey. The American backwoodsmen therefore generally took the easier (though somewhat unsportsmanlike plan, according to our ideas), of seeking for their roosting places after the fall of the leaves, and shooting them down while sitting aloft on some clear starlit or moonlight night, the lowest bird being always taken first, so that his fall might not alarm those below him; in this way a whole roost numbering twenty or thirty birds could sometimes be killed for the market. Like almost all birds, the turkey had a favourite spot where, so long as he was allowed to perch there undisturbed, he was accustomed

* *The Hunting Grounds of the Great West*, by Col. R. I. Dodge, U.S.A., 1877, p. 233.

to pass the night; but this once discovered, laid him naked to his enemies.* The mere sound of the firing was rarely sufficient to cause them to start off, unless they had been much shot at. Frank Forrester also mentions another plan of finding them by the sounds of their "gobbling" in the early dawn. "Wild turkeys (he says) often begin 'gobbling,' a little before the break of day; but usually continue on their roosts, till broad daylight." The hunter can therefore frequently manage to cautiously creep up to the tree upon which they are perched, and secure some of them. This noisy confabulation in the early morning, affords the easiest way of discovering the locality where they roost, while the droppings under the trees serve to indentify the exact spot with certainty; but in former days when turkeys were plentiful, the "moonlighting plan" was supposed to be the best time for a gunner to choose for bringing most birds to bag—as they are apt to fly off when alarmed after daybreak.

The wild turkey, we may add, is a bad flyer, but like the pheasant, a first-rate runner, and it requires a good horse, or a dog, to overtake it. If caught away from cover, however, and the hunter gets between the turkey and the timber, so that it can be headed away from the trees, it may occasionally be ridden down, as each of its flights gets shorter, and it soon becomes tired out. The Indians assured us that turkeys frequently get lost in attempting to cross great rivers, by reason of their short flight. When about to attempt such a crossing, their gobblings may generally be heard afar for some time previously, as they fly up to the tops of the highest trees, to get

* The habits of the peacock, in countries where it is indigenous, are similar.

a good "take-off" for the attempt: but as they keep slowly descending in their flight all the way across, it often happens (so these acute observers of the wilderness say) that they fall into the water before reaching the opposite bank, and thus get drowned.

We ought to say a few words in passing on the forest varieties of the grouse. This class of birds seem to be common all over Northern Canada, Sweden, Norway, Russia, and Siberia. The "ruffed grouse" (*Tetrao Umbellus*) is a good typical example of these birds in America—and the ryper or hazel grouse (*Tetrao Bonasia*) in Scandinavia is another—so is the larger variety of it, the "Skov" or "Dal-Rype" (*Lagopus Sub-Alpina*) known to the English sportsman in Norway as the wood or willow grouse, as also the capercailzie (*Tetrao Urogallus*) the king of the grouse tribe, which is found all over the pine forest region of Northern Europe. These birds may all more or less be regarded as forest varieties of the grouse tribe, as distinguished from the red or heather grouse of Scotland (*Lagopus Scoticus*), the black-cock (*Tetrao Tetrix*), and the ptarmigan or snow grouse (*Lagopus Mutus*): each of these latter being moorland birds, inhabiting the bare hill slopes, above the range of tree growth; of these the ptarmigan is distinctly a denizen of the snow region, and only commences to appear at altitudes where the red grouse ceases to be found and where the black-cock also commences to disappear. * Therefore, in a great

* In Gould's splendid work entitled *The Birds of Asia* (7 Vols. imp. folio) plates are given of at least four varieties of Himalayan snow grouse, inhabiting the great table-lands of Thibet and other northern hill states. Among these we may mention the *Tetraogallus Himalayensis* or Himalayan snow grouse, and *T. Thibetanus*, or the Thibetan snow grouse: both large and beautiful birds, which Mr. Gould describes as "*Partridges*." See Gould's "*Birds of Asia*," Vol. vii., plates 30 and 32.

forest country, we have a succession of varieties of birds of this family, which occupy separate belts extending from the lowlands to the region of eternal snow. First on the meadow lands and cornfields of the plain, the partridge (represented in Great Britain by the *Perdix Cinerea* (or grey partridge); then follow the tree perching varieties of grouse, inhabiting the forest lands; with the moorland and snow varieties extending beyond them again, either on the barren hill tops or northwards, beyond the region of tree growth—the last-named ascending, we cannot doubt, to the very pole itself, if there is (as we have every reason to suppose is likely) land in those far northern wastes. *

The moorland varieties are well known to the British sportsman, we need not therefore describe them here; but the forest grouse no longer exist in the British Islands; they therefore deserve a short description. They are found all over Northern Europe and Asia and are annually imported from Russia and elsewhere, in large numbers to supply the English markets: where they may be seen during winter and spring, hanging in rows in our poulterers' shops. They consist for the most part of the four varieties already named. First, the hazel grouse which inhabits the pine forests, where the bilberry (*Vaccinum Myrtillus*, Linn.) and other berry-bearing undergrowths occur, and when young these birds are delicious for table use. Secondly, the wood or willow grouse, a somewhat larger bird than the preceding, which keeps mostly to the birch woods, and rarely resorts to the heavy pine forest. This birch forest in Lapland and elsewhere, generally skirts the northern

* See our section on the Arctic Zone.

limits of the pine growth: where the latter begin to disappear, the birch tree replaces the pine; still further north the birch gradually gives place to barren moorlands (called Tundras in Siberia), and in this region, upon its bushy margins we venture to fix the usual home of that splendid game bird, the capercailzie, a species of gigantic grouse, that often run up to 12 or 14 lbs in weight. This bird is however of a very wild and wandering nature, keeping mostly in the dwarf bush on the edge of the moorlands in summer, where it feeds upon the numerous berry-bearing plants; descending during winter to the pine forest, where it lives upon the young shoots of the pine trees, so that its flesh towards spring frequently acquires quite a disagreeable flavour of turpentine—as also does that of the other kinds of forest grouse at the same time of year. In America, the most common and widespread of the forest grouse, is the ruffed grouse (*Tetrao Umbellus*) in that part of the world known under several names, such as the birch partridge or the American pheasant. This fine bird is common, from Georgia northwards as far as the barren grounds of Northern Canada, right across the continent in wooded districts. Its favourite places of resort being high mountains, covered with pine, and other trees: it is seldom found on open plains. *

The variety that inhabits the American plains region is the prairie chicken or pinnated grouse (*Tetrao Cupido*), a splendid game bird, which is abundant throughout the prairie region—especially near the haunts of men, where there are cultivated lands, the prairie chicken

* See Frank Forrester's *American Field Sports* (by Henry W. Herbert), Vol. i, p. 65.

being one of those birds that follow the plough in contradiction to the forest varieties which shun the society of man.

As an example of aquatic, or water-loving birds, which likewise shun his society, and perish before the advancing tide of human progress, the bittern may be cited as a good instance. Formerly the common bittern (*Botaurus Stellaris*) used to be very plentiful in the British Isles, and their loud booming call note, might be heard resounding at eventide in the vinicity of most extensive swamp lands; but as cultivation has extended, and the marshes have been drained, so its numbers have progressively decreased, so that it is now almost extinct in these islands. *

The American variety (*Botaurus Lintiginosus*), in the same way, has retreated before the human tide, and is now rarely found except in remote regions of swamps and morasses far removed from the habitations of man. We may here perhaps venture to remark, that most of the waders, that is birds which seek their prey while standing in the shallows of marine estuaries, or of inland waters, are usually of a very wild and wary disposition; we may mention the well-known instances of the heron, (*Ardea Cinerea*) and the curlew (*Numenius Arquata*) —(of both of which classes of birds there are several varieties), as good examples of this sort. It is very hard to get near any of these birds, unless by approaching under some sort of cover; they are always exceedingly watchful and keen of sight, and the moment they

* *History of British Birds*, by W. Yarrell, F.L.S., 2nd Edit. 1845, Vol. ii, p. 540. Among other British birds, partially exterminated, we may mention the Crane (*Grus Communis*), the Capercailzie (*Tetrao Urogallus*), and the Bustard (*Otis Tarda*) (See *Encycl. Brit.*, 9th Edit., Vol. iii.).

detect the presence of the human enemy, they are off before he can get anywhere near them; and yet at the same time it is curious to remark that such an apparently alarming object as a train passing close by at full speed with the usual amount of noise, in some places does not alarm them. * They have learnt in fact, that the noisy railway train always keeps to one track, and never deviates from its course to do them an injury. Consequently in places where they are accustomed to see it, they regard its passage with indifference. Do the birds do that without thinking? It would be too long to go into questions such as those of reason and instinct here, which are eminently technical matters: we however quote this example of reasoning faculties among wild birds as an instance of how quickly even the most easily alarmed species come to recognize the true enemy from the false one; if a "permanent way" official walked along the line, in the ordinary course of his duty, these birds would decamp before he got within several hundred yards of them.

In the same way, all kinds of the wildest birds will walk about and feed, surrounded by herds of cattle, sheep, or other animals, either wild or domestic, without exhibiting the slightest signs of alarm; yet if a human being of any sort appears within sight, they fly off at once: more than that, if they see that cattle or sheep have sighted a man, by their standing gazing in his direction, both wild birds, and also quadrupeds will instantly accept the hint and make off to safer

* We may cite as an instance herons seen on the marine lagoons near Malahide, County Dublin. The Great Northern Railway of Ireland has constructed embankments right across these places, and these birds may be seen almost always standing in the shallows close by, when the trains are passing, without flying off.

quarters: though why they should imagine man should single them out as objects of his hostility is not at once apparent: yet they have come to know that he often does do so, while he spares the domestic cattle which are objects of his care.

Sportsmen out on the mountains, in Scotland etc., being aware of this, are in consequence generally very careful when stalking deer, or out grouse shooting, not to startle a flock of sheep if they can help it, because they know that the panic will spread from them to the wild game, and inevitably alarm a considerable extent of moorland. So too on a lake or sea coast, the alarm created by the springing of two or three frightened birds quickly places every other species on the alert: there is nothing therefore that the punt gunner has a greater aversion to than meeting with and springing single birds that may happen to be in his path, as a few individuals may in this way so spread the alarm that all chances of getting a successful shot at numerous flocks become exceedingly remote.

It may be that these flocks may be nearly all soundly sleeping, wearied by the labours of the previous day, or night, while dispersed in quest of food: because in hard weather and under various casualties, birds often have to roam long distances in search of their daily sustenance; upon these occasions it is usual for them to disperse over the country in quest of whatever they can pick up: after the feeding time is over they reassemble, having evidently agreed upon a general place of rendezvous, where the members of the society can meet together again, and seek repose under the mutual protection of associated numbers. This shows

that the birds come to a mutual understanding about this before they disperse, and this is a further instance of that exercise of thought which we find pervading the societies of members of the animal kingdom which are gregarious in their habits. Some kinds of birds are diurnal and feed only during the day, reassembling to pass the night in flocks. A good example of this is the common rook (*Corvus Frugilegus*); their nightly rendezvous is mostly among the old trees whereon they nest in spring time, and their coming home to roost at dusk is practised with such regularity that by noting the passing of the flocks to their roosting place, and timing them with a watch, it will be found they return almost to the moment at the same hour every evening, for days together. These birds as we know are dispersed all over the country by day, in pairs or even as single birds. Again there are the birds of nocturnal habits, who feed mostly, or perhaps altogether during the night: their habits of course are the exact reverse of those of the rook as regards time, but in other respects are very similar: we find most wild fowl in the ordinary acceptation of the term, such as the wild duck (*Anas Boschas*), the widgeon (*Anas Penelope*), and the teal (*Anas Creeca*), with many others following these conditions of life, probably because they are then less liable to be interrupted than by daylight.

In a thickly inhabited country like Great Britain, these birds when undisturbed mostly remain asleep upon some quiet sheet of water, by day, in hard times; or if they are not fatigued by the previous night's wanderings, they pass the time in swimming about and amusing themselves, or in feeding if that is practicable; but generally soon after dark they all take wing and

proceed to scatter in search of food, and passing the night in this way, reassemble in small batches on the water by dawn on the following morning. These times therefore generally form the best opportunities for the gunner's skill—if he can ascertain what are known as the duck passes, or lines by which they fly when dispersing at dark and reassembling at dawn, good sport can generally be had:—but of this we shall have more to say presently.

When the flocks have reassembled, and when an opportunity occurs to examine them by day with a good glass, they are never found all asleep together: a certain number of alert sentries are always posted on the outskirts of the flock, which with head erect, keep watch with unflagging vigilance over the safety of the sleeping company, exactly as do the sentinels of a human army in a hostile country. This shows a high degree of organization and discipline; the practice seems to be common to all assemblages of creatures of the animal kingdom, whether birds or quadrupeds: all seem to be more or less vigilant in this respect, and even when the rest of the company are busily employed in feeding, the sentinels do not partake of food, but keep constantly on the alert. These watchful guards must of course be changed from time to time, and others appointed to keep watch in their place. How is all this to be managed, unless there is complete discipline, and a clear understanding as to these duties, among the flocks? This power of organization betokens, to our mind, a far higher order of intelligence among members of the animal creation than people generally give them credit for.

Then there is the question of the language of wild-

fowl and the well-known fact that they are able to communicate their thoughts to each other: of this there can be no doubt, indeed experienced wildfowlers always know, *by the talk of the birds,* whether they are in a suspicious mood or not; and if they are, it is generally waste of time to attempt to creep or punt up much closer to them, as some of them are sure to be in a position to catch sight of him. Wild moorland birds on mountains for instance, probably have their sentries posted on top of some high rock or other eminence in the vicinity, from whence they can overlook everything all around where the flock are feeding or resting.

Other birds feeding on a plain, perhaps have their sentry perched aloft upon a tree, if there is one near by, from whence he can see everything that approaches. So again, aquatic wildfowl feeding in large companies, on the ooze left uncovered by the tide, at night invariably have their sentries some little distance out from the rest of the flock, where they have the best chance of detecting the approach of a foe. And in all these cases, a single low note of alarm, uttered by the sentry, is sufficient to put the entire company instantly on the alert: on hearing this the whole of the birds at once cease feeding, and in complete silence sit keenly on the look-out for the suspected foe. The moment therefore that the experienced fowler hears the "talk of the birds" suddenly cease, he takes the hint, and remains himself absolutely still and motionless: the least noise at such a moment would cause the whole company to rise with one consent, and with the sound almost as of a peal of thunder, caused by the simultaneous beating of innumerable wings, the vast assembly takes its

departure for the open sea. On the other hand, if the fowler maintains perfect silence, and moves neither hand nor foot; after a time, no enemy appearing, the birds regard it as a false alarm, and gradually recommence feeding: this the fowler knows by hearing their *talk* beginning again; as soon as it does so, he cautiously continues his advance, carefully listening to the voices of the birds, until he gets near enough, if he is fortunate enough to do so, to get a favourable shot.

This system of sentries, and vigilance, on the part of numbers, always renders the creeping up to large flocks a matter of much greater difficulty than if there were only a few birds present; at no time, so far as our own experience goes, are fowl so constantly and keenly on the alert as when assembled in these large numbers. To approach them with any chance of success therefore, the fowler must have a thorough acquaintance with the habits and voices of all the different kinds of birds which he is at all likely to meet with. Large flocks, such as we are at present considering, generally consist of a number of different varieties of wildfowl, such as wild duck, widgeon, and teal, and other kinds of birds which frequent the coast, all of which have their distinctive call notes. Consequently, "the fowler (says Mr. Folkard) must become acquainted with the language of wildfowl, and be able to know by the talk of the birds when he is suspected, and when they have thrown off their alarm. It may require years of experience to become familiar with such signs and expressions, but when once learnt the hunter reaps his reward in the extra success attending his exertions." * "The faintest croak

* *The Wildfowler*, by H. C. Folkard, 1875, p. 113.

is full of meaning, and is instantly obeyed by all who hear it." *

These very large flocks of wildfowl are however unfortunately becoming rare upon our coasts, in consequence of the constant persecution of the birds by shore gunners, who are continually popping at them, all day, and sometimes all night too; stress of weather however, every now and again still brings in vast numbers of wildfowl of all kinds from abroad, upon the occurrence of exceptionally severe winters. The prodigious numbers seen by the old gunners upon the British coasts in bygone days are nevertheless greatly diminished, if we are to trust the accounts given in the ancient records, which show that our harbours and river estuaries were *then* literally swarming with their assembled legions.

It seems probable that these countless myriads of birds were in many instances mostly migratory flights, driven down from the northern regions by the severity of the winter cold; and if this be so, it is not unlikely that in these modern days they may have modified their flight lines; and descend along the Danish and Dutch coasts, instead of, as formerly, coming to the British Islands. It does not follow, as we venture to believe, that the race of wildfowl is becoming extinguished by human agency, as people are often so prone to imagine. When we reflect that the great breeding grounds for the fowl are in the pathless wilds of the Arctic regions, it seems hard to conceive that any amount of desultory popping by unskilled gangs of idle rustics could permanently affect their numbers very greatly, during their occasional visits

* *The Wildfowler*, by H. C. Folkard, 1875, p. 109.

made at considerable intervals to our coasts. We know also that the flocks of wildfowl still seen upon the Danish and Dutch coasts in quite recent times are out of all proportion greater than anything witnessed of late years upon the British seaboard. When the waters of the Baltic close with ice in winter, it necessarily drives southwards most of the wildfowl that inhabit the Scandinavian and Russian coasts. As a rule however, the Norwegian seaboard remains always clear of ice, except perhaps in some few altogether exceptional winters, when the fjords may perhaps skin over with a thin coating of ice for short periods. That this should be so is a remarkable fact, when the whole of the Baltic coasts every year become closed to navigation by the accumulation of heavy ice. It is not however generally known that the Baltic (as a whole) is not a salt sea, but an inland sea, mainly consisting of fresh water: so that fresh water fish, such as perch and pike, may be taken in every part of the Gulfs of Bothnia and Finland, in summer time.

The salt sea really comes up very little beyond Stockholm. This fact alone therefore will go far to account for the annual closing of these gulfs by ice—though there are other considerations, which must not be left out of account, which have already been discussed in these pages, and which undoubtedly exhibit a wonderful example of the way in which Nature brings about apparently inexplicable variations of climate. Thus we find a seaport in the icy ocean, *viz.*, Hammerfest on the north coast of Norway, in Lat. 70° 39′ 15″ N., Long. 23° 42′ 0″ E., and the most northern city in the world, maintained permanently free from ice: any interference with navigation by ice being there almost unknown.

When however the Baltic becomes fast closed, and the whole of the adjacent territories deeply covered with a winding sheet of snow, for months together, it follows that the aquatic bird tribes must seek somewhere else a more hospitable shore, where the stormy seas at least remain constantly open. This therefore accounts for the winter visits of vast companies of these fowl to the British and other adjacent coasts during hard winters, of which the early part of the year 1895 may be cited as an altogether exceptional example. Vessels leaving the Thames during January and February 1895 did so under quite arctic conditions, the whole river being crowded with ice drift, and all shrouds and rigging of shipping covered with frozen rime and icicles. We were at the Antipodes at the time, but there can be no doubt that during this prolonged period of intense cold (for our climatic record), birds of all kinds must have suffered most severely, and have been driven long distances in search of warmer weather. It was therefore not surprising to find ships returning from the southwards during the following spring, plentifully made use of as havens of refuge by large numbers of birds, which had lost their way and which, without such help, would in all probability have perished.

The winter of 1853 was another exceptionally severe season, and fortunately we are able to give an account left us by an eye witness, who on that occasion saw those wondrous flights of wildfowl of which we have spoken, collected together in the narrow channels between Scandinavia and Denmark, on their way southwards.

"The quantity of aquatic birds" (says Captain Lloyd) "such

as widgeon, golden eye, etc., that at times congregate at openings in the ice, is enormous. When in the winter of 1853, which was very severe, Mr. Alexander Keiller was crossing the Great Belt in an ice boat—which was then entirely frozen over, with the exception of a very narrow channel in the middle—he saw such multitudes of fowl as filled him with astonishment. *Billions* (said he) would give no idea of their numbers; and when they took wing, it was not simultaneously, but in succession, like unto clouds of dust that arise from a highway, when swept by a whirlwind. Owing to their being so closely packed together, it would have been impossible for them all to have flown up at once. When they were all fairly on the wing, they literally darkened the air. The open channel was fringed with dead and dying: many had perished with starvation, and not a few owing to their helpless condition, had been killed with sticks; others again had been destroyed by birds of prey, more especially eagles, several of which were seen sitting, gorged with their victims." *

This gives a good idea of what one of these vast assemblages is like; and reading between the lines, we see how unwillingly these poor birds are driven from their native wilds; and how they cling to the last strip of closing water, before they take wing and fly away to foreign lands. But the imperious necessity of want leaves them no alternative: thus we also obtain an insight into one of the phases of that fierce struggle for existence, which is everywhere going on in the world around us among every order of creation. Life therefore is, as we have already remarked, a continual warfare, always being waged to keep itself in existence; rest and peace are at best but temporary intervals of intermission in this perpetual struggle.

* *The Game and Wildfowl of Norway and Sweden*, by Captain L. Lloyd, 1867, pp. 370—371.

One of the last of these great incursions of wildfowl from the north, upon our coasts, took place during the winter of 1880 and 1881. In Ireland that season is still regarded as "the great wildfowl year," and Sir Ralph Payne-Gallwey, in his book on Irish coast shooting says, that it was the best season ever known there; his game list footing up to 1500 birds of the duck species, as the result of the season's sport.—The best month (probably January 1881, which was very cold and calm) producing 800 wildfowl, and his best week 300. *

These results look almost like a return of the good old times; but we can have no doubt that the multitudes of duck seen upon the Irish coasts on that occasion, were simply a temporary incursion of birds driven by the severity of the cold from the northward, in the way we have already described.

Sometimes while the assemblages of such great migratory hordes of fowl last, heavy shots may occasionally be made by day, by sailing to them on the open sea; but most generally the greatest successes are made with a punt and punt gun at night, when great companies of them are collected together feeding upon the mud banks left uncovered by the tide. The companies of widgeon upon the estuaries of the Irish coast being still at times so immense, that Sir Ralph Payne-Gallwey states that the roar of sound produced by their countless pinions, as they rose or pitched, could be heard a mile or more away, even when the wind blew from the fowler towards the birds. † This

* See *The Fowler in Ireland; or Notes on the Haunts and Habits of Wildfowl and Seafowl*, by Sir Ralph Payne-Gallwey, Bart., 1882, p. 12.

† *Ibid.*, pp. 37 and 38.

accumulation of small sounds, a single one of which would by itself be inaudible, is justly referred to by Sir R. Payne-Gallwey as a wonderful example of such phenomena. Mr. Darwin however mentions a still more remarkable instance of it in a vast flight of butterflies, the beating of whose wings became in the same way distinctly audible a short distance off, in consequence of their immense, incalculable numbers. Such flights of butterflies are still common in Ceylon and other tropical lands, and sometimes continue almost without intermission for weeks together.

We do not propose to enter into any regular description of the science of wildfowl shooting with a heavy punt gun (though we have ourselves done a little of it in our time); the matter being too intricate to be capable of being done justice to in a few paragraphs. Two excellent works of modern date upon the subject are those of Sir R. Payne-Gallwey (already referred to), and "Modern Wildfowling," by Wildfowler. * The older works of Mr. H. C. Folkard † and Colonel Hawker § are still standard authorities on the same subject. The latter especially may be justly regarded as the father of practical wildfowling with a punt gun: no man ever having had larger or more varied experience with wildfowl of all kinds than the celebrated Colonel Peter Hawker: though of course much of what he says on the subject of guns is now completely out of date.

* *Modern Wildfowling—Punts and Punt Guns*, by "Wildfowler" of *The Field*, published at *The Field* Office, London 1880.

† *The Wildfowler*, by H. C. Folkard, (On "Punt Guns and Decoys,") London 1875.

§ *Instructions to Sportsmen*, by Lt.-Col. Peter Hawker, edited by his son, London 1859 (originally published 1826).

Nevertheless of course the habits of fowl, and the general principles which must be observed in their chase, remain unchanged; and on all such points as these Colonel Hawker's opinions are those of a master.

Colonel Hawker for instance holds that bright starlight nights are the best of all times for getting at birds, just as the rising tide flows over the mud, particularly if there is a slight breeze, without wind enough to blacken the shallow water, and if there is a cold black frost, so much the better, he says. On the other hand, what is perhaps contrary to the ideas of most novices, fog, snow, or hazy weather of any kind, is very bad for coast shooting, as it makes everything upon the water appear large and black, and causes the birds to be very restless, and quick to take alarm—as also do very dark nights—wildfowl being much on the alert and very suspicious on such occasions. In dark thick weather therefore, the Colonel advises every gunner to remain in bed. Even in bright moonlight widgeon and other birds, he considers, are easier approached than on these unfavourable occasions,* provided the sportsman advances upon them out of the shade.

This latter point in all night shooting is of vital importance; whether it be at the desert drinking pool, or on the shores of the restless sea, while creeping up to fowl:

"When shooting by moonlight," says the author of "Shooting" (Badminton Library Series), "there is no possible chance of getting near fowl save by coming in from the shade towards them, that is with the moon before you, as you paddle towards the birds. If you come down upon them with the

* See *Instruction to Young Sportsmen*, by Lieut.-Col. Peter Hawker, 6th Edit. 1830, p. 335.

moon behind you, they will surely see you and make off long before you are within shot. The same principle holds good in the morning: you must paddle towards the rising sun; or in the direction of the glow left in the sky after sunset. At such times, though in the gloom yourself and so nearly invisible, the fowl will appear sharply outlined against the light." *

This stands to common sense: for all a man has to do is to look out over water by moonlight and observe the long avenue of brilliantly lit surface, showing out white like snow under the rays of the full moon, which stretches forth between him and the pale Queen of Night, and he will at once realize this fact. Ducks etc. upon it, a moderate distance away, are clearly visible, so also of course would a man be; the trouble is, that it is not easy to get people to observe and recollect these facts. In the same way it is always of essential importance to observe the set of the wind: the olfactory powers of most wildfowl are exceedingly acute; and if the fowler hunts down wind, he must not be surprised to find the birds have smelt him, and made off; efforts should therefore always be made, when that is possible, to approach a company of wildfowl either up wind, or across wind: though no doubt their sense of smell is less keen than that of some of the large game animals like elk, moose, and other members of the deer tribe.

The powers of scent in wildfowl should however always be kept in mind by fowlers, as we feel convinced that the sudden flying off of ducks, without apparent cause, while the fowler is noiselessly endeavouring to creep up within shot, may frequently be attributed to their ob-

* *Shooting*—Moor and Marsh—of Badminton Library Edit., by Lord Walsingham and Sir Ralph Payne-Gallwey, Bart., 1886, Vol. ii, p. 177.

taining his wind, which sets them at once on the alert, so that the slightest circumstance then suffices to spring them.

For this reason among others, when the sportsman carries only an ordinary fowling-piece, it is often better policy to be satisfied with following a small knot of birds, rather than a large flock, some of whose outlying sentinels are apt to catch sight of him, though he may be so placed that the main company cannot do so; it is rare that numerous hosts can be successfully approached on water, or on mud flats, near enough for a small gun to make a heavy shot. Flight shooting is the best chance for the fowling-piece; and big companies upon banks on their last legs with rising tide, for the punt gun; great slaughter may of course ensue in the latter case if a shot can be put in, at the right moment, with a heavy piece of wildfowl artillery.

The best sport for the shore gunner is obtained by small companies of birds coming past him on the wing, either going out to the feeding grounds at night, or better still returning to the flight ponds, from these grounds, at dawn. A little low-lying mist or fog, not too thick to hide objects up to 30 or 40 yards away, is then sometimes very useful, as the birds cannot see the fowler till they are close to him. Colonel Hawker's observations to the contrary (already quoted), refer only to punt shooting on marine estuaries: but he expressly guards himself by confining his remarks to that, and says—"Fog, in the fens and marshes, is sometimes the best weather, although quite the reverse on the sea." * This, if we might venture to say so,

* *Instructions to Sportsmen*, by Lieut.-Col. P. Hawker, 6th Edit. 1830, p. 335.

in support of so eminent an authority, is our own experience.

The Colonel however considers that, "flight shooting is always followed with most success in very boisterous weather, provided the course of the birds happens to be against the wind, as this not only obliges them to fly low, but doubles them well together."—"Should the weather be clear, and the birds come in high, the best chance of a shot is to conceal yourself between the banks of some small creek, as they will lower their flight on reaching the mud. Be careful to shoot well forward."—"In rough weather you may sometimes have sport for the whole day by digging a masked entrenchment, at the extreme end of some promontory that divides one well-stocked bay from another." *

In inland shooting an excellent place for this sport is on a short connecting stream between two large lakes; here a blind constructed among bushes etc., is usually very successful, as such places commonly form what is known as "a duck pass."

The customary fly lines of ducks, and other aquatic birds, passing to and from their feeding grounds (or in other words the duck passes), are places which it is of vital importance for the sportsman to discover and make himself thoroughly acquainted with.

This he will of course, in an inhabited district, find out from those residents who use a gun; but in wild countries, unless he can obtain native assistance, he will have to find this out for himself. Generally they follow the courses of great rivers—small islands therefore in mid-stream are often good stations—or else they go along the streams connecting chains of lakes and swamps. Dry spots among swamps in these sort of

* *Instructions to Sportsmen*, by Lieut.-Col. P. Hawker, 6th Edit. 1830, p. 307—8.

places therefore often make good stands for duck shooting. In coast shooting the movements of wild fowl depend altogether upon the state of the tide; with the utmost regularity they repair to certain banks which form their feeding grounds as the tide recedes from them—returning seawards as it covers them again.

On the South African coast, immense flocks of waterfowl may be seen skimming along the wave crests, on their way to and from such places, with such regularity as to time that one can tell the exact state of the tide by their movements.—Flock follows flock with the regularity of a military expedition, all going in the same direction. We used often to watch these flights with great interest, speeding upon their way day after day upon these wild and storm-beaten coasts, where heavy tangles of kelp, and other giant seaweeds may often be seen, almost filling the shallows. In America one of the great wildfowl grounds used to be Chesapeake Bay, the great inland marine lagoon that divides the mainland on the borders of the States of Maryland and Virginia. This used to be, and indeed is still, the home of innumerable myriads of the celebrated canvas-backed duck and other wildfowl. The canvas-back (*Anas Valisneria*) is a deep water duck, which mainly gets its food by diving. It feeds upon what is there known as the wild celery (*Valisneria Spiralis*), a bulbous aquatic plant that grows mostly in deep water, either brackish or fresh, and the delicacy of flavour imparted to the flesh of the canvas-back as a bird for table use is no doubt produced by the wild celery they have eaten.*

* See *Shooting on Upland, Marsh, and Stream*, Edited by W. B. Leffingwell, 1890, pp., 406—7.

Extraordinary stories have been related respecting the vast numbers of aquatic birds which used to haunt the waters of the Chesapeake a generation or so ago; resident settlers upon its shores state they "have seen the sky darkened with them, and the Bay like driven snow, as their white backs glistened in the sun; when they rose it was like one continuous roll of thunder." * These birds had all certain well-known lines by which they moved from one part of the bay to another: here the professional fowler lay in wait for their coming, either in a "sink boat" or other "blind" anchored on the water, and surrounded by decoys; or else upon some spit running out into the water where, as Colonel Hawker advises, holes were sunk wherein the fowler concealed himself, until the unsuspecting fowl were close upon him. This continual persecution has of latter days driven away the greater part of the birds. The canvas-back however, also frequents the great lakes, and other waters of the interior, wherever in fact the wild celery, or the wild rice, grows in abundance. There are always great collections of aquatic fowl of many kinds to be found where these valuable game-supporting water-plants do well; for so far, we believe both of them are peculiar to America, as they have never been successfully naturalized in Great Britain or elsewhere, though at first sight there does not seem to be any apparent sufficient reason why they should not be so.

Concerning the first, *Valisneria Spiralis*, or wild celery, we have already said something; its chief habitat may be said to be on the head waters of the

* See anecdote related in *Shooting on Upland, Marsh, and Stream*, Edited by W. B. Leffingwell, 1890, p. 414.

Chesapeake. This enormous land-locked sheet of water has all the characteristics of an inland sea, with an approximate area of some 3000 square miles;* an examination of the chart shows that it is generally shallow; and moreover is the recipient of a number of extensive river systems, so that at its northern extremity its waters, like those of the Baltic, no longer retain their saltness, being only slightly brackish, and in some parts almost fresh. It is in these localities that the "duck-weed," or plant known as the wild celery, grows in the greatest luxuriance, and here in consequence the mightiest flocks of wildfowl of every description are congregated; it would be too long, and also unnecessary, to attempt to enumerate their various species, though many people hold that at least one of them, the red head (*Anas Ferina*), another deep water diving duck which is also exceedingly numerous, is quite as good for table use as the much belauded canvas-back. It also lives mainly on the wild celery.

The wild rice (*Zizania Aquatica*) is a fresh water weed, or plant, growing in shallow streams, and around the margins of ponds and lakes, throughout North America, it is said from Northern Canada to Florida; it is an annual grass which sometimes attains the height of nine feet, and grows very thickly in many rivers, where it thrives even in the brackish waters of some of their estuaries; its grain can be utilized as a bread stuff, and used to be largely used as such in the old Indian times, but its chief value is as food for waterfowl. There are tropical varieties of it, which

* This bay is margined almost everywhere by large expanses of shallow lagoons; separated from the broad water by islands, as well as numerous very extensive river estuaries. The rise of the tides is but small, often not over a foot.

grow in the West Indies and the southern parts of North America, notably *Zizania Miliacea*. Wherever it flourishes it attracts multitudes of wildfowl. Mr. Leffingwell mentions that a shooting party of three or four gentlemen, at the foot of Bancroft Lake in Northern Iowa, shot on the rice marshes there for three days; the birds he says, live there in thousands; it was impossible to drive them away, so that when the party left they were as plentiful as ever—"I believe (says Mr. Leffingwell) I could have killed 1000 ducks in ten days." *

This will give the reader some idea of the extraordinary value of the wild rice in attracting wildfowl. Though this chapter has already spread out beyond the limits we had intended, we think it would be a pity to bring it to a close without some mention of the duck shooting at Long Point on Lake Erie, a place renowned as a sportsman's paradise even long before the British conquest of Canada. The place it seems is now in the hands of a sporting club, or company, for whose use it is exclusively reserved. The preserve consists of an extensive sand spit, jutting out from the Canadian shore for 9 or 10 miles, in a curving form, into the waters of Lake Erie: it varies from 2 to 4 miles in width. The greater part of this tract consists of rice-marshes; and is composed of shallow pools, with channels leading from one to the other, in which the wild rice and other aquatic plants grow in great luxuriance. From time immemorial it has been the home of countless myriads of wildfowl; so great is the fame of this wildfowling ground, that

* *Shooting on Upland, Marsh, and Stream*, by William B. Leffingwell, 1890, p. 128.

it has been mentioned as such in all the histories of British America; a good account of it has been lately given in *The Field* newspaper by a British naval officer, who lately obtained some days' shooting there, and who killed a little over 400 birds in five days' sport.

The sight of the enormous flights of duck, as the sportsman's punt is being poled along to his shooting station, "must (he states) be seen to be realized: the rising of the ducks from the reeds and rice almost baffling description in numbers and variety: finer sport cannot be imagined." *

There is just one other water-plant which we think ought to be briefly mentioned, as a game feeding substance, namely the marine grass (*Zostera Marina*), a long, narrow, ribbon-like sea-grass, of yellowish green colour, which grows plentifully on mud flats left exposed by the tide in Great Britain, † and many other countries, as far north as the Arctic Circle. It forms the great attraction to wild geese; and the well-known brent goose (*Bernicla Brenta*), one of the best table birds of the goose species, is said to live upon it almost exclusively. The pursuit of these extremely shy, wild birds, necessarily mainly falls to the lot of the regular wildfowler in his gunning punt. The fowling-piece is too light a weapon for brent geese, as it is difficult to get within shot. The brent goose nests in the Arctic regions, and rarely visits our coasts in any considerable numbers, until driven from

* See letter signed "J.H.O.—*H.M.S. Blake*"—from Bermuda, Nov. 21, 1894, in *Field* of January 12, 1895, p. 67.

† In Sowerby's *English Botany*, 3rd Edit., Vol. ix (1869), three varieties of this grasswrack are figured *viz.*, 1. Zostera Marina, var. Genuina (Linn.) Vol. ix., plate 1429, p. 60. 2. Zostera Marina: var. Angustifolia, Vol. ix, plate 1430, described p. 60. 3. Zostera Nana, or Dwarf Grasswrack, Vol. ix, plate 1431, described pp. 61 and 62

the north by the sealing up of the waters under the influence of frost. At these times however extensive flocks, or gaggles, of these geese are frequently met with on our estuaries, where this sea-grass grows at all plentifully. They rarely come inland, and generally pass the day at sea, only flying in to their pastures on the mud flats by night. A great resort of brent geese is Tralee Bay, in the South of Ireland, where according to Sir R. Payne-Gallwey, 40 brent were killed at one shot, with a punt gun, about 1865, by a Mr. Graves. His gun was a regular piece of artillery, 12 feet long in the barrel, weighing 300 lbs and carrying a charge of $\frac{3}{4}$ of a pound of powder and $3\frac{3}{4}$ lbs of shot.* Such a weapon, though immensely powerful, Sir R. Payne-Gallwey considers too heavy and cumbersome for general use: a boat fit to carry it with the two men necessary for working it would no doubt have great difficulty in navigating the exceedingly shallow waters at the edge of the mud banks in many places, where the best sport is generally to be had. Tralee Bay however being mostly deep water enables heavy metal to be used. The heaviest shot Sir R. Payne-Gallwey says he ever knew to be made at geese, was fired by Grimes of Limerick, another big gunner, who obtained 43 bean geese (*Anser Segetum*) at one shot, on the ooze at the mouth of the River Maigue, County of Limerick. His gun carried half a pound of powder and $2\frac{1}{4}$ lbs of shot. These geese are very much larger than brent, being the size of ordinary farmyard geese, of some varieties of which it is probable that the bean goose is the wild ancestor.

* *The Fowler in Ireland; Notes on the Haunts and Habits of Wildfowl and Seafowl*, by Sir Ralph Payne-Gallwey, Bart., 1882, pp. 152—3.

The great objection to these heavy shots, made for the most part by night, upon tidal waters, is the number of maimed and wounded birds that must make their escape grievously hurt. This, though probably a necessary and unavoidable evil attached to every form of sport, must nevertheless be a matter of regret to all true sportsmen; on the other hand real wildfowl, like the brent goose, and other similar birds, have become of late years so scarce, so wary, and hard to approach, that there is hardly any alternative left, except to follow them with regular pieces of wildfowl artillery: the ordinary shoulder fowling-piece, could effect but little among these birds, its range and power being so inferior to that of a punt gun.

In the diary of the celebrated Colonel Hawker for example (just to give an idea of the power of these heavy pieces), we may mention, that the Colonel states that on January 18, 1842, at Keyhaven, he caught the geese just at the ground ebb, and threw both barrels of his heavy double punt gun into them, loaded with mould shot, at a range estimated at near 200 yards, killing 28 on the spot, while 12 more were afterwards picked up, making a total of 40 wild geese killed at one shot at this immense range.* This celebrated gun carried $2\frac{1}{2}$ lbs of shot and in that day cost £250 to build, and is now said to be in the possession of Mr. B. Reynardson, "who justly considers it the finest piece of wildfowl artillery in the world."†

After a heavy shot, wounded birds, known as "cripples," of course make off as quickly as they can;

* *The Diary of Colonel P. Hawker*, by Sir Ralph Payne-Gallwey, 1893, Vol. ii, pp. 34—35.

† See *The Fowler in Ireland*, by Sir Ralph Payne-Gallwey, 1882, p. 153.

those of the geese species, swans, or diving ducks, always to seawards, or to the nearest deep water, where they are most expert in diving and swimming; while the other birds of the duck tribe, including waders of all sorts, make at once for the shallows or the land, where they hide themselves in the nearest cover, whether of grass, water reeds, or bushes. Almost the only time a wounded duck of this class will put out towards the deep water, is when he wants to cross it, and land on the opposite bank—as for instance in a pond or river—so that he may be separated from his assailant by the breadth of the water. If it is a small sheet of water, by beating up the edges an hour or two after wounding a duck, the sportsman can often succeed in bagging an escaped cripple.

It is a curious fact that the feathers of a badly wounded bird no longer seem capable of turning water; in the case of dead birds especially, the water penetrates completely through the feathers to the skin, soaking the bird thoroughly. This opens up the curious question as to how the feathers of aquatic fowl cast off the water, and so keep the birds quite dry, while floating upon the waves, even of a stormy sea.

And popularly it is always taken for granted that the feathers of aquatic fowl are rendered impervious to water because of a species of natural oil, with which they are lubricated; and there can be no doubt that their feathers are to a certain extent oily; but we apprehend from the fact that a dead bird's plumage ceases to resist the entrance of water, some other cause than the mere oily nature of the feathers must operate to cast off water, during life. Mr. St. John, an acute observer of Natural History, and sporting

matters of every kind, makes the following observations on this subject:—

"The imperviousness to wet of the plumage of the waterfowl is evidently not caused by any power the birds have of supplying oil or grease to their feathers. The feathers have a certain degree of oiliness no doubt, but from frequent observation, I am convinced that it is the manner in which the feathers are placed, which causes the water to run off them as it does. As long as a wild duck of any kind is alive, the skin remains perfectly dry, though in water, but the moment a waterfowl is dead, the water penetrates through the feathers, wetting him completely. If a wing is broken, the feathers of that wing immediately become soaked, the bird not having the power of keeping them in the proper position to resist the entry of water. We know that birds are able to elevate, depress, and move their feathers in every direction, by a muscular contraction of the skin.—When this ceases the water enters." *

We can come to no other conclusion than that Mr. St. John is right in these opinions: the fact that water does enter the plumage of dead birds, every man can easily ascertain for himself; and it is not easy to see how this could be explained in any other way than that suggested by Mr. St. John. Here we may remark, that in boat shooting, where dead and wounded birds have to be lifted out of the water as the boat passes by, a landing net should be taken, as Colonel Hawker wisely advises for this purpose.

In closing this section of our work, as wildfowl shooting frequently necessitates great exposure to the weather, perhaps it will not be deemed out of place if

* *Natural History and Sport in Norway, and of Wild Sport in the Highlands* (of Scotland), by Charles St. John, reprint of 1882, pp. 63 and 64. (N.B.—The author lived 1809 to 1856).

we venture to say a few words upon the care of health by sportsmen. Decidedly no one should attempt to incur the exposure which the sport of duck shooting entails during severe weather, unless he is blessed with robust health. The wildfowler is of necessity often exposed to the rigour of the elements, and to the influence of cold and wet, to a degree unexampled in other kinds of sport. Wildfowling in the first place is almost altogether a winter occupation, and the colder and more boisterous the weather, in many cases, the more favourable are the prospects of sport. A peculiarly hard winter in the British Islands therefore, always proves a good season for wildfowl shooting of every sort. The duck shooter often has to wade for hours through swamps when the water is icy cold; and has to wait behind blinds for the arrival of birds in the severest weather. If he is a punt gunner he has to be out, in all weathers, for the greater part of the night. The constant wet and cold to which he is exposed, therefore, cannot but prove a severe trial to the strongest constitution.

How fatal the effects of cold really are upon the human system, only those who have made these things a study can adequately conceive; it may be broadly stated that chills of one sort or another are the primary cause of most cases of fatal illness. "As a predisposing and exciting cause of disease (says Dr. Quain) cold proves in this country, year by year, more fatal in its effects than any other single condition or influence. Any considerable fall in the thermometer below the average standard, during the colder months, is followed by a corresponding rise in the death-rate, and an increase in still greater proportion, in the extent of sickness and suffering." *

* See *Quain's Medical Dictionary*, Vol. i, p. 272.

When we remember therefore, how greatly the wild-fowler is subject to the risk of chills, and the fatal effects which are shown to frequently follow from such causes it is not wonderful that so acute an observer of everything pertaining to the sportsman's necessities, as Colonel Hawker, should in his still classical work upon sporting matters have been most emphatic in his cautions to young sportsmen with regard to the care of their health. He speaks we may rest assured from long years of personal experience, after undergoing a life of almost unexampled exposure and hardship, in the pursuit of his favourite diversion; and yet in the irony of fate, it is worth noting, that after all, he himself fell a victim to the effects of this overstrain placed upon his once iron constitution. The immediate cause of death was heart disease, brought on by overwork, and though one of the hardiest of men in regard to health, that could be imagined, these things told upon him in the end, and during his latter years he was constantly fighting against illness, and finally died in London, August 7th, 1853, in the 67th year of his age. *

Colonel Hawker we may remark, was an old Peninsular Officer, who served in the 14th Light Dragoons (as they were then called). He was severely wounded at the Battle of Talavera in 1809; retired from the army in 1813; and died as above stated.—He was a good musician as well as a keen sportsman: composed much music; patented improvements to the pianoforte in 1820; and was the author of several literary works of merit. † In the valuable, and most

* See *The Diary of Colonel Hawker*, 1802 to 1853, by Sir Ralph Payne-Gallwey, 1893, p. vii of introduction.

† See the *Dictionary of National Biography*, by Leslie Stephen and Sidney Lee, Vol. xxv, 1891, pp. 200—201.

interesting book which he has bequeathed to posterity, on guns and shooting, the gallant Colonel speaks to the young sportsmen of the future as follows, and it will be unnecessary for us here to add a single word to his wise and appropriate advice:

"Never fast too long, and avoid, whenever you can, fagging too hard; or when you come to middle age you will most likely begin to feel it; perhaps so much so as to become nervous, and lose your good shooting. Remember this advice, and see who will last the longest: you who do, or those who do not, follow it. Never go out with quite an empty stomach to wait for wildfowl, particularly in the morning. Never sit down in wet feet, or with wet clothes on any part of the body: if a change is not to be had, keep in motion, or go to bed till one can be procured." *

* *Instructions to Young Sportsmen*, by Lieut.-Col. Peter Hawker, 3rd Edit., 1824, pp. 459 and 460.

CHAPTER XVIII.

FISHING.

Excellence of the Fishing in Some Wild Countries. Explanation of Contradictory Reports about Some Waters. Value of the Angler's Art to Travellers. Fishing in Dry Countries. Fish buried in the Mud of Dried-up Pools. The Advent of the Rains. Detached Pools in River Beds in the Dry Season. Plains Rivers. Fishing in Prairie Streams. Sea Fishing. Necessity for Local Knowledge on the Part of Fishermen. Shoals of Fish. Migrations of Fish. Analogy between the Habits of Fish and Game Animals. Probable Causes of the Desultory Movements of Fish. Sea Fish of the Northern and Southern Hemispheres Contrasted. Inferior Quality of the Fish of the Southern Seas. Numbers of the Different Kinds of Fish known to Ichthyologists. Deep-sea Fish. Importance of Obtaining the Aid of Local Fishermen. Uses of Charts. Taking Bearings of Good Fishing Grounds. Long Lines. Equipment of Fishing Smacks. The Great Banks of Newfoundland. Sea-fishing off the British Columbian Coasts. Magnificence of the Salmon Fisheries. Examples of Remarkable Takes of Fish by Anglers. The Norwegian Fisheries. Great Shoals of Cod-fish. The Loffoden Fishery. Tarpon Fishing in Florida. Great Strength and Gameness of Tarpon. Tarpon Rods. Jointed Rods Inadmissible. Tarpon Reels. Tarpon Jumping. "Playing" Heavy Fish. The Best Fishing in Bright Hot Weather. Sport in Florida in General. Australian Varieties of the Tarpon Species. Ocean Fishing, from Ships at Sea. Pelagic Fish. Bonitas, Albicore, Flying Fish, etc. Fish everywhere numerous in Mid-Ocean. Shark Fishing. The Different Varieties of Sharks. Norwegian Shark Fishing. Dangers to Bathers from Sharks. Tackle for Sea Fishing. Lines. Snoodings. Chop-Sticks. Leads, Baits, etc. Fish Baits. Artificial Baits. River and Lake Fishing. American Fishing. Gigantic Trout. Sea Trout Fishing. Fishing in Lake Superior. Fishing in Labrador. Fishing along the Canadian Pacific Railway. Baits in Manitoba and the N.W. Fishing in Minnesota. Mosquitoes. The Plague of Flies. Means of Protection against for Fishermen. Fishermen's Waterproofs. Cooking on Board Small Boats. Sudden Storms on Lakes. Fresh Water and Salt Water Waves. Precautions as to Small Boat Sailing. "Watching the Clouds." Navigating Lakes by Night. Camping on Islands. Boat Voyages on Rivers. Fishing in Tropical Waters. The Case of Mr. H. M. Stanley's Rearguard. Net Fishing on African Rivers. Pools on the River Atbara in the Dry Season. Sir Samuel Baker fishing on the Atbara.

Net Fishing in East African Rivers. Fishing in South Africa. Fishing in South America. Mahseer Fishing in India. Mr. H. S. Thomas on Indian Fishing. Gaffing a Captured Fish. Traveller's Outfit for Fishing in Wild Countries. Rods. Makeshift Bamboo Rods. Mr. J. K. Lord on Fishing in the Wilderness. Hand-lines for Lake Fishing. Rod Rests. Manufacture of a Bamboo Rod. Fishing Lines. The Care of Lines. Reels. Hooks. Eyed Hooks. Fly Tying. Triangle Hooks. Artificial Fresh Water Baits. Spoons. Artificial Flies. Gut, Wire, and Gimp. Very Fine Steel Wire for Traces. Split Rings. Mounting Spoons. Silks. Wax, etc. Colourless Wax. Fishing Nets. Net-setting under Heavy Ice. Practice of Hudson Bay Co.'s Men in Winter. Air-holes. Night Lines. Valedictory Remarks. The Great Book of Nature. Thomas Paine upon. Obituary Notice of Thomas Paine.

AMONG the sports for whose peculiar excellence the wilderness is renowned must be numbered that of fishing.

But as every angler is already aware, this sport is everywhere apt to be uncertain, especially in unknown waters, being good at some seasons while nothing at all is to be caught at others, even in the most promising looking places.

This fact will explain the very often diametrically opposite opinions expressed respecting the same piece of fishing. One man perhaps was there, and fished at the right time, and tells us he had splendid sport: while another did the opposite and got nothing, and thinks the whole thing a delusion and a snare.

A prudent man will therefore be careful in forming conclusions upon hasty reports of these matters. As regards the uncertainty as to the prospects of sport, there can be no doubt that good and bad fishing is greatly dependent upon the condition of the water and changes of the seasons. Still the matter is one which is by no means very well understood; because sometimes, even at the most apparently unpropitious mo-

ments fish will be found to take well, in a way that it is not easy to account for; so that in point of fact, in fishing, as in many other things, a man never knows what he can do till he tries.

Travellers journeying through wild countries should therefore never omit to carry with them a supply of fishing tackle, as the angler's art has often been found of the highest value in supplying the larder, when provisions were scarce or not to be had; and of course near sea coasts or during boat expeditions upon great rivers and lakes very often the main reliance is upon fish.

Nor is it possible for a traveller who proceeds upon an inland journey, even through a dry and thirsty land, ever to foretell when he may find his fishing-tackle stand him in good stead. Wherever there are rivers or pools there is generally fish of some sort in them, and curiously enough in some hot, arid countries, where the waters periodically dry up entirely during the dry season, the fish are not thereby exterminated, as one might at first suppose. Those species of fish which Nature has placed in such places are able to bury themselves deep down in the mud, and there continue to exist in a sort of torpid state until the return of the rains. *

When the beneficent water then pours down upon the parched-up ground in fertilizing streams, the whole face of Nature is suddenly changed, as if by magic. Every tree and herb at once springs into verdant life.

* Among other authorities see *Encycl. Brit.* of 1881, Vol. xii., p. 665, (Article "Ichthyology.") "It has been stated that in India fishes may survive in this condition for more than one season, and that ponds known to have been dry for years, and to a depth of many feet, have swarmed with fish, as soon as the accumulation of water released them from their hardened bed."

The rivers again roll down, filling the dry watercourses with a turbid flood, setting free the imprisoned fish to rejoice once more in a renewed lease of life and liberty—thus furnishing us with another of those numerous instances the student of nature meets with at every turn (and nowhere more than in the Wilderness) which teach us that however great may be the apparent difficulties which Nature has to contend with, there is no such word as "impossible" recognised in her economy. Everything to her is not only possible, but easy, and wherever a difficulty arises, means are provided to cope with it. It is therefore impossible for us to say where life may exist, seeing that it *does exist* under the most apparently (to us) impossible conditions.

In the case of great rivers flowing through barren deserts the difficulty is often bridged over in a different way. Intense heat and months of drought, wherein not a drop of rain has fallen, may have to a great extent dried up the beds of these rivers, but as a rule deep pools are still to be found existing at intervals along their courses,—which have been excavated by the powerful current during the rainy season —and form havens of refuge for their finny inhabitants. And there they are often to be found collected together during the dry season, in incredible numbers, sometimes furnishing the angler with splendid sport. We shall give instances of this further on.

It may also be well to say a few words upon the subject of the broad shallow streams which are generally found in considerable numbers crossing the surface of extensive plains, such as the great prairie region of North America.

These streams form a peculiar class of river, doubtless on account of the flat nature of the country, and are at times of very considerable width, with perhaps only a few inches of water flowing over their shingly beds. At first sight people might be apt to suppose that no fish would be found in them; indeed old prairie travellers will sometimes be found to assert that such is the fact—still almost all these streams usually reward the patient angler with a goodly number of nice, though small fish; * as he will in almost all cases find numerous narrow channels, some of them probably of considerable depth, at intervals along the courses of these rivers; such places afford excellent retreats and shelter for fish, though they might very likely escape the notice of a hasty observer.

The foregoing examples of waters which at first sight appear to hold out anything but an inviting prospect to an angler, are of course mentioned not with any view of advising the selection of such places as angling resorts, but in order that, while doing homage to the boundless resources of Nature in this as in every other department of her work, we may point out how the skilful and enterprising fisherman may almost everywhere occasionally obtain fairly good sport, even under the most apparently unfavourable conditions.

The exercise of the angler's art under its normal conditions must now be considered.

Sea fishing will require to be dealt with by itself, as it necessitates the use of special boats and other

* See *The Hunting Grounds of the Great West*, by Colonel Dodge, U.S.A., 1876, p. 247.

gear, which as a rule are unsuited to inland waters. Probably therefore it will be most convenient to briefly glance at this branch of the subject first, before entering upon the question of fresh water angling.

As is found to be the case with respect to all great waters, the exercise of the fisherman's craft in the open sea is a matter which requires a good deal of local experience, before a man can hope for successful results; for we are met with the same kind of difficulty which a stranger encounters when shooting in great forests—namely, the extent is so enormous, and the supplies of food for the various forms of animal life so abundant, that in both cases the human atom is swallowed up in the surrounding immensity, and his little efforts brought to naught.

Passing, however, to the more immediate consideration of our subject, from the foregoing among other circumstances we can at once realize the necessity, already alluded to, for the sea fisherman to be possessed of local knowledge concerning the waters in which he purposes to carry on his occupation. His chances of success will evidently greatly depend upon his being acquainted with the nature of the bottom. If it is what is known as "foul ground," of course fishing, except at the surface, would very often be out of the question. It is therefore above all things necessary to be acquainted with the position of the "banks" where fishing can be carried on, or else to obtain the information from local sources. Indians or other natives are however sometimes very unwilling to impart information on these matters to strangers; but by watching how and where they go to fish, by means

of a good glass, the desired intelligence may generally be acquired.

Another all-important point is to have an accurate knowledge of the times when the shoals of fish may be expected to arrive upon the coasts. Many kinds of sea-fish are very migratory in their habits, periodically appearing and disappearing from the banks at regular intervals—and in fact only visiting the fishing grounds in any considerable numbers at certain seasons of the year.

In this respect again the habits of fish resemble very much those of the wild animals and birds inhabiting the great hunting grounds throughout the world. Most of these animals and birds, as we have already pointed out, are well known to migrate with the changes of the seasons, sometimes to great distances; so that a country which at one time is literally swarming with game of all kinds, at another contains little or nothing—the game having then deserted it. This is a matter which is of course more fully considered in the sections on hunting and shooting. But had we the means of accurately determining the causes of these fish migrations, we should probably find that the same causes which govern the migrations of animals on land, govern those of the deep sea also—namely, variations in temperature, and the periodical abundance and scarcity of food in the various localities, according to the changes in the seasons. But our knowledge of the habits of the finny tribe is practically almost nil, everything being still very much a matter of conjecture, and possibly may always to a certain extent remain so.

It is, however, a matter of ascertained fact that "Temperature is the supreme condition which determines

the distribution of marine animals." * And as a rule all the best table fish are found in cold water: the inferior quality of the fish in tropical seas is generally admitted.

Also, the fish found in the Northern Hemisphere are generally far superior, as table fish, to those in the Southern Hemisphere; and so far as is at present known, this will be found to apply equally both to the salt and fresh water fish. Mr. Hursthouse for instance states that in the case of New Zealand—"Billingsgate could show a dozen good fish for New Zealand's one. Indeed in my (Mr. H.'s) opinion there are not six good table fish to be found in all the seas south of the equator." † Now New Zealand, we can say from personal knowledge, has the best fish of any of our Australian colonies; magnificent oysters for instance are very plentiful in the South Island. The fish at the Cape of Good Hope are in like manner, with one or two exceptions, of very inferior quality.

As regards the numbers of different sorts of fish thus far known to exist, it may be interesting to state on the authority of the *Encyclopædia Britannica*, that there are of

Fresh water fishes, total number of species known	2270
Sea water fishes " " " " "	3587
Grand total of species	5857 §

The science of Ichthyology is however very imperfect, and this list must be considered as a provisional

* See "General Conclusions" in Introduction to the *Report on the Scientific Results of the Voyage of H.M.S. Challenger*, Vol. i. (p. 48 of Introduction).

† *New Zealand, the Britain of the South*, by Charles Hursthouse, p. 78.

§ *Encycl. Brit.*, 9th edit., Vol. xii., p. 670 (Article "Ichthyology").

one merely, to which considerable additions may reasonably be expected.

Then, as regards the question as to the depths to which fish are supposed to descend into the ocean, it may be stated that the most recent investigations leads those who have given this subject their special attention to believe that "there is no depth limit to animal life in the ocean." * This subject however, as well as other scientific data of interest concerning the inhabitants of the mighty deep, has received special attention elsewhere in this work, and it would, we think, be inconvenient to overload the section on fishing with a mass of technical details of this description. Nevertheless the question of our sea fisheries and other collateral subjects of the same kind are of supreme importance to a naval nation like Great Britain, a Colossus whose feet are planted in the ocean, and on whose command of the seas her national existence may be said to depend. Great wars have been fought, for instance, to maintain or dispute the right of a "several fishery" (in legal parlance) on important fishing grounds, and the same questions may again, in future years, assume the position of a "casus belli."

We shall now endeavour to sketch as briefly as possible the principal points which must be attended to by all who expect to become successful as sea fishermen.

Whenever circumstances admit of it, it is of course always most desirable to go to work under the guidance of some reliable old hand, chosen from among the local fishermen who know the coast thoroughly. If that be impracticable, the first thing to do is to obtain

* See the Introduction to the *Report on the Scientific Results of the Voyage of H.M.S. Challenger*, Vol. i., p. 48.

the charts of the locality, which will be sure to afford much information of the greatest value to fishermen. The soundings and nature of the bottom will be found marked upon them; these details for instance, are matters which among others generally determine the kind of fish likely to be taken. Any ground where good fishing is obtained should be carefully noted and marked by the fisherman upon his chart, so that this exact spot can be found without difficulty at any time. For this purpose, if the coast is visible, bearings should be taken of some prominent objects on shore. This should be done on two imaginary lines, drawn by the eye from the boat to the coast, when on the fishing ground; and upon each line two objects, in line over each other, should be noted, as marks by which to identify the position, and—

"as great precision is necessary in some kinds of fishing, the marks selected should not be too close to each other, neither should the lines of direction be too oblique; but where a choice of objects exists, select those which will afford as near an approach as possible to a right angle." *

Splendid sport may often be obtained in sea fishing, but unless the traveller is on board a yacht or other seagoing vessel, probably his efforts will be confined to hand-line fishing, or long-line fishing.

By long-lining, large quantities of fish may often be caught with a minimum of trouble. These lines consist, as most people are aware, of a main line of strong cord or small rope, to which a number of hooks are attached, tied on short pieces of fishing line, about two and a half feet long, and six and a half or seven feet apart, so that they may not foul each other. Stones

* *The Sea Fisherman*, by J. C. Wilcocks, 2nd edit., 1868, p. 5.

or anchors are attached to the ends of the main line, and also floats to indicate its position when it is desired to haul it in. These lines, by the bye, do good work in extensive inland waters, as well as at sea. Of this we have personal experience.

Regularly equipped fishing boats carry immense lengths of them, sometimes extending to eight or ten miles, which the fishermen shoot across the tide. Sometimes the lines are shot in the evening and hauled in next morning. * At other times fishing is carried on by day only. "On board cod smacks (for instance) fishing upon the cod banks, these lines are shot about five o'clock in the morning. When all are out, the boat lies for about two hours, while the men are getting their breakfast, and then they commence to haul the lines again." †

"The fishing outfit for a cod smack on the Dogger Bank for this sort of work is as follows: 16 dozen of lines, each 30 fathoms long; two of these lines or 60 fathoms are called a 'piece;' 6000 hooks and snoods—52 of these hooks are put on a 'piece' of line, the distance between them is 8 feet 6 inches." § "For the Iceland or Faroe fishing, where a good deal of hand-line fishing is done, the cod smacks carry outfits for hand-lining consisting of: 4 dozen lines each, 35 fathoms long, wound on reels, or frames; 3 dozen cod leads; 3 dozen cod wires to go through the leads, these have an eye seized to each end to carry the snoods. The snoods are from ten to twelve feet long to carry the gauged hooks—300 to 400 hooks of various sizes—small files for sharpening hooks, and an assortment of knives for splitting, heading, and gutting the fish." **

* *The Sea Fisherman*, by J. C. Wilcocks, 1868, p. 9.

† *Fisherman's Seamanship*, by O. T. Olsen, F.R.G.S., 8vo, Grimsby, 1881, p. 64.

§ *Ibid.*, p. 61. ** *Ibid.*, p. 62.

These details are furnished to give travellers desirous of trying their hand at this sort of sea fishing, an idea of the outfit carried by regular fishing boats, out of which they can of course select such parts and quantities as may suit their requirements. Very pleasant parties may often be made up, by hiring a small vessel, for a short trip to fishing grounds of well-known excellence. Travellers visiting Newfoundland (our oldest and yet perhaps least known British colony) for instance, hardly need to be reminded that wonderful sport may still be had upon its great banks and coasts. In the days of sailing ships it used to be quite a regular practice for vessels crossing the Banks of Newfoundland, to lie to, or anchor for some hours if the weather permitted, to give passengers and crew an opportunity of doing a little codfishing, and thus supplying the ship with a quantity of fresh fish and valuable food which cost nothing. The records of most of the old sailing voyages to America via the St. Lawrence and other northern points make mention of this matter as a regular custom. *

"The great Bank of Newfoundland is an extensive shoal to the S.E. of that island, upwards of 330 miles in length by 75 in width, with water over it varying in depth from 16 to 60 fathoms. The fishing season commences about May, and continues until September. Fishing is carried on near the shore in small boats, and on the great bank itself by schooners. Each person manages two lines, and each line carries two hooks, and good hands will take 3 to 4 cwts of fish in a day." †

The principal bait used is the capeling, a small fish.

* See Annburry's *Travels in America*, 1776 to 1781, published London 1791, Vol. i., Chapter i.

† *The Sea Fisherman*, by J. C. Wilcocks, 1868, p. 161.

Magnificent sport may also be obtained on the coasts of British Columbia and Alaska upon the Pacific coast of North America, of a similar kind, as cod abound there also.

When the author visited those coasts some thirty years ago, probably the majority of the numerous tribes of Indians lived entirely upon fish—especially upon the countless myriads of salmon that annually ascended the rivers of those countries—which they used to dry for their sustenance during the winter months. The canned salmon trade on some of these rivers is now a large and lucrative business; and magnificent sport can still be obtained by anglers in the narrow seas between Vancouver Island and the mainland, by trailing with a spoon under sail or oars, during the summer and fall of the year, when both salmon and trout can be taken in large numbers. Recent reports from the locality state that early in October "boats can be seen in all directions trolling for salmon; and at all hours of the day the splash of the fish can be heard. A person can see a fish hauled into one of the boats almost every moment, early in the morning." *

In the year 1889 the fishing seems to have proved unusually good in these waters.

"In June and July (in that year) there was a run of big fish averaging 20 lbs near Esquimalt (Vancouver Island). One was caught 49 lbs—all taken with the spoon. In August and September there was another run of smaller fish up to 12 and 14 lbs, and one afternoon fishing with two rods from a boat, 47 fish were caught, averaging 6 to 7 lbs each; also some cod with spoon up to 30 lbs. Quantities of big cod

* *Forest and Stream* (American sporting paper) of November 1st, 1888.

(so this report assures us) are taken at Esquimalt trailing with the spoon." *

Esquimalt, we need hardly remind our readers is the naval port of Vancouver Island, and the head-quarters of the British squadron in the Pacific. The scenery all around it is magnificent in the extreme, and in our day a trail led through the forest to Victoria, a distance of some four miles to the northward, and an immense encampment of Indians was stationed to the southward of the harbour of Victoria. In those days Victoria itself was but a small place, and the whites were but a handful in the midst of an overwhelming Indian population. So that it was only the presence of the navy that enabled us to live at all, for the Indians had a great and wholesome dread of the white man's "war canoes."

Splendid sport can also be had along the coasts of Norway, especially towards the northern portion of it. Here, even over the sides of passenger steamers anchoring during the summer trips, in the fjords, at some of the many stopping places, very fine cod-fishing can be had. Passengers proceeding as far as the North Cape should therefore never fail to take with them a good cod line, wound upon a frame, together with a few hooks and some large spoons fitted with strong triangular hooks.

Cod-fish abound upon the Norwegian coasts in shoals of almost inconceivable magnitude, so that in places, at certain seasons, the whole floor of the sea is literally paved with them.

In fact no inconsiderable portion of the revenue of Norway is the produce of these great fisheries, one of

* See letter in *The Field* of December 7, 1889.

the principal of which is at the Loffoden islands. The scenery in the vicinity of these islands is of the grandest description, some of their jagged points rising from 3000 to 4000 feet above the sea. In this fishery—

"above 20,000 men and 3000 boats are employed, and the average take of fish is estimated at 21 millions. The fishing banks consist of three ledges; the first lying at a depth of about 30 fathoms, the second at 45, and the third at 120 fathoms. The fishery is exclusively carried on in open boats, and of late years these cod-fisheries have been extended north to Vardö, and a second take is made as late as June." *

The codfish (*Gadus Morrhua*, Linn.) as we know, is everywhere more or less a deep bank fish, only coming in towards the coasts in pursuit of the shoals of small fish upon which it preys, or to spawn, and so enormous is its fecundity that it is stated on good authority that "the roe of a cod contains 2,000,000 eggs, and if all these came to maturity, one cod would fill the ocean in a few years."—"The quantity of codfish annually taken from the banks and shores of Newfoundland and Labrador, may be estimated to be 4,000,000 cwts, worth about 15/- or 16/- a cwt, and averaging 50 codfish to the cwt." †

As regards the fishing to be had in the warmer regions of the earth, splendid sport may be enjoyed off the coast of Florida at the tarpon fishing, under all the advantages of a brilliant sunshine and the balmy breezes of the south. This fish (*Megalops Atlanticus*) which is a species of giant herring, has been caught

* Murray's *Handbook for Norway*, 7th edit., 1880. Route 20, p. 145.

† *The Commercial Products of the Sea*, by P. L. Simmonds, 1879, pp. 26 and 27.

nearly 200 lbs weight, and invariably costs the angler a severe struggle before it gives in.

Tarpon fishing lasts from January till May, but it is at its best during the last two months of this time; and the fish are taken either with a rod or a hand-line. The sport has become quite a fashionable one of late years in the United States, and draws many visitors to Florida when tarpon are taking freely. A list of fish caught during the season of 1889, between January 30 and May 8, from the Tarpon House Hotel, Punta-Rassa, on the west coast of Florida, was published in the American sporting papers. *

This list gives the size and weight of 113 fish which were caught there, of which the largest was 165½ lbs in weight and 6 feet 10 inches in length, while the smallest was 44 lbs and its length 4 feet 6 inches; 59 fish out of the 113 were 100 lbs weight or over it, and only two fish were under 50 lbs. Another account of this kind of fishing appeared in *The Field* of June 1890, from which it appeared that the tackle found most efficient was—

"a rod of about ten feet long, very stiff, made of split bamboo, with 200 yards cotton line, very strong, but thinner than a salmon line; to the end of this a piece of thick soft snood is attached, with a hook about three inches long by one inch across. The bait is a quarter of mullet. Sharks are very numerous, and the question of snoods is a most troublesome one, for you must use one that a shark can bite through and a tarpon cannot. If you use wire, a shark would not be able to bite it and would probably smash everything. On the other hand a hard snood would be instantly cut by the shearlike action of a tarpon's jaws; also the hook would be

* See *Forest and Stream* of May 29, 1890.

gorged, for no hook could hold in its armour-plated mouth. It took four hours hard struggle to capture a tarpon of 118 lbs, 6 feet 6 inches long, and he towed the boat over three miles. The strain on the line was tremendous, the line sounding, when touched, like a violin string." *

Another letter in a previous number of the same paper gives a somewhat similar account, warning the anglers that "the line must be strong enough to allow the boat to be towed about by the tarpon, which has to be played for two to five hours before it is sufficiently exhausted to be gaffed, and sometimes the angler is exhausted before the fish, and has to hand his rod to someone else." †

It must be obvious that with such weighty and powerful fish a long rod gives too great a leverage on the arms, and so combines with the tarpon to tire out the angler; also the great strain put upon it renders a jointed rod of any kind inadmissible. The rods therefore, according to the latest authorities, are now used quite short, being only six or seven feet long, and all in one piece. §

It stands to reason that a large and powerful winch must be used to carry the great length of line which it is necessary to be provided with, in order to be able to keep the fish under control during his first frantic rushes and desperate struggles for liberty. These efforts generally include a number of tremendous springs into the air, frequently to the height of six or seven feet or more out of water; the size of the fish can thus be judged while displaying his silver

* See *The Field* of January 7, 1888.

† *Ibid.*

§ See *Handbook on Sea Fishing*, Badminton Library, by J. Bickerdyke, 1895, p. 450.

sides to the enraptured eyes of his would-be captor, ere this formidable variety of the herring falls down again with a mighty splash into the water. It has been observed that those fish that jump well are generally in the end easier to manage than a sulky specimen, which refuses to expend its strength in this way, and sullenly keeps up a sub-aqueous warfare. Indeed, in the latter case the odds seem to be that the angler is fast to some other kind of big fish, such as the Jew fish, or a shark, in which case it not infrequently happens that the fisherman, after being towed about in his boat for some time, finds discretion the better part of valour, and is glad to cut, or break himself loose from the formidable monster, as best he can. The use of a stout leathern "tarpon belt" to prevent the butt of the rod from injuring him, is almost a matter of necessity for anglers in these waters. This belt seems to be an admirable contrivance, and strikes us as being just the thing wanted by all anglers who troll much. It consists of a stout leathern bucket, large enough for the end of the rod to be fixed into it, which is firmly attached to the belt, and thus effectually prevents any risk from the rod being brought into contact with the fisherman's body. The price of this belt in New York is stated as $1, and a complete outfit for tarpon fishing can be got for £10 English ($50), most of which goes for the reel, for which the charge is £6 ($30 in America). * It is advisable to take three or four rods, as it is the custom of many anglers to use several rods at a time, while awaiting a bite from the tarpon, which like

* See *Handbook on Sea Fishing*, Badminton Library, by J. Bickerdyke, 1895, p. 450.

many other fish is very changeable and uncertain in its habits. It has, however, been found to take better in very bright weather than on dull days, and it is generally said that the hotter and brighter the day, the better chance there is of good sport. In this respect the tarpon follows the example of the celebrated fresh water sporting fish of India, the Mahseer (*Barbus Macrocephalus*) for which the water can never be too clear and bright, or the weather too hot.

The visitor to Florida will do well to bring his guns as well as his salmon and trout rods with their tackle, for the waters of Florida literally teem with numerous varieties of wildfowl and fish of all sorts and sizes. In landing on the bush-clad banks of lakes and streams, or in travelling through the bush in the wilder sections of country, we may add, it is highly desirable that the traveller should be provided with good leathern gaiters, as snakes are exceedingly numerous and venomous. It is but a few years ago since an English gentleman met a sad end in consequence of neglect of this precaution. He was wearing knickerbockers and stockings only, when a rattlesnake suddenly struck him on the ankle, and he died in great agony some hours afterwards.

The wildfowl shooting as well as the fishing is sometimes very fine, immense flocks of duck of many kind, besides numerous other species of beautiful birds, abound; among the wading birds for instance, the pelican, the flamingo, the egret, ibis, heron, etc., are often seen in large flocks.

Captain Townshend, speaking of the incredible numbers and varieties of the fish states that they are something quite phenomenal, and says—

"The moment a baited hook was thrown in, it was immediately seized by some voracious fish. Sometimes the strong hand-line broke at the first tug, and sometimes we hauled alongside the boat monsters we dared not handle, and so had to cut the line ourselves and let the fish go, hook and all." * Further on, the same author mentions that "in the magnificent bay called Charlotte Harbour, fish are found of such size, and in such numbers, as I could not have believed existed in any part of the world, had I not myself seen them. They bumped against the bottom of the canoe, threatening to upset us, and impaired the play of our paddles in the water. I have no doubt such a statement may appear incredible, but it is no less a fact." †

In many ways for a winter sporting tour, both for gun and rod, Florida possesses many advantages not easily to be matched elsewhere though there are no heavy game animals. Good tarpon fishing is also to be had in the harbours and on the coasts of Jamaica. Here the tarpon rise readily to the artificial fly. §

It may be interesting to some of our readers to mention that the tribe of giant herrings is by no means confined to Florida and the adjoining coasts. The tarpon (*Megalops Atlanticus*) may represent the finest variety of these fish, but our Australian waters are known to contain at least two other varieties, which run the tarpon closely, *viz.*, *Megalops Cyprinaides* which has been taken over five feet in length, and *Chanos Salmoneus*, over four feet in length. Both

* *Wild Life in Florida*, by Captain F. L. Townshend, 2nd Life Guards, 1875, p. 114.

† *Ibid.*, pp. 121 and 122.

§ The hill stations of Jamaica are now quite a fashionable winter resort, where a most enjoyable time may be spent in a magnificent climate and among enchanting scenery. Jamaica has also of late years become celebrated for her fruit markets, the most splendid fruits of many kinds being produced there.

these fish are to be taken off the Queensland coast, and along the Great Barrier Reef of Australia, which runs for quite 1250 miles along the N.E. coast of that continent.* The limits of these pages will not admit of our giving a description of the fish and fisheries of this marvellous Australian marine aquarium —for such we may truly call it. In our chapter on the ocean however we have given a short account of this and other great coral reefs. Nowhere, however, are these natural wonders to be seen in greater perfection than on the Great Barrier Reef.

Passengers on board coasting steamers anchoring off their ports of call, can often beguile the time they are detained in harbour by bringing out their hand-lines, and can frequently obtain very fair fishing, in many parts of the world. They will find that a supply of fishing tackle will well repay its cost and the trouble of carrying it. But more especially, persons making voyages on board sailing ships can at times obtain excellent sport in mid-ocean, in tropical seas, when dolphins, bonitas, albicore, and other fish are seen frequently playing round the ship in numerous shoals; but very strong lines and hooks, attached to copper wire traces, will be required. Large-sized spoons would probably be very effective. Indeed as a rule in all waters nothing does better all round than the spoon; but a good bait is readily made with a piece of raw pork skin five or six inches long by two or two and a half inches wide, through which the hook is passed twice, so that the

* *The Great Barrier Reef of Australia: Its Products and Potentialities*, by W. Saville Kent, Ex-President of the Royal Society of Queensland, published London 1893, imperial 4to (splendidly illustrated), p. 302.

shank is covered by the pork skin. The top of the bait is then tied above the hook to the wire trace, to prevent its slipping down upon the bend, and doubling up with the action of the waves. The tail of the bait should extend for half its length beyond the hook, and have a narrow triangular slice cut out of its middle, leaving two tail pieces like those of a fish to play in the water. The action of this bait may be increased by jerking the line and making it leap out of the water, when the fish will spring to catch it, and sometimes even take it in the air. *

"Bonitas are very handsome fish" ('bonita' in fact is the Spanish for 'pretty') "and so are albicore; they are both a species of giant mackerel—the bonita is about two feet long, with dark blue back, marked with bluish green stripes; and albicore only differ from bonita in being considerably larger." †

It is quite a mistake to suppose that fish are generally scarce near the surface far out to sea, as is sometimes alleged. The whole sea is everywhere full of life and of fish, as witness the constant rising of shoals of flying fish in the tropical seas. There can be no doubt that these little fish mistake the ship for some marine monster intent upon destroying them, and their rising from the water shows that this is their usual way of effecting their escape from enemies.

In the Indian Ocean on one occasion for nearly an hour we saw vast shoals of these flying fish (*Exocœtus Callopterus*) rising one after the other from nearly every wave, in such numbers that the sound made by them in springing from the water was distinctly audi-

* *The Sea Fisherman*, by Wilcocks, 1868, p. 223.
† Walsh's *Notices of the Brazil*, 1830, Vol. i., pp. 106—7.

ble, and sounded much like the noise made by flocks of waterfowl in rising.

The presence of such numerous shoals of these fish is indicative of other shoals of larger fish, which undoubtedly follow the flying fish to prey upon them. Indeed, by keeping a sharp look-out over the surface of the deep, it is seldom that a careful observer will pass even a single day without catching sight of larger fish of some sort; he will also occasionally observe the water lashed into foam, in spots where numerous shoals of fish are either disporting themselves, or in the act of preying upon smaller fry.

Therefore, if in ocean-fishing no fish are caught, it is not because they are not there, but because they are frightened away by the ship, or else see the line and suspect a snare, or perhaps do not approve the bait.

Both at sea and in harbour, in many parts of the world where the waters are infested with sharks, exciting sport may be obtained in the capture of one of these monsters of the deep.

"The great white shark of the West Indies (*Squalus Carcharias*, Linn.) is the most formidable of all the inhabitants of the ocean: for in none are the powers of inflicting injury so combined with the eagerness to accomplish it. They usually cut in sunder any object of considerable size, and there is no hesitation in passing into the stomach, even what is of enormous bulk. Captain King in his Survey of Australia says he caught one which could have swallowed a man with the greatest ease." *

The usual bait for them is a large piece of meat of some kind, put on a hook the size of a salmon gaff,

* *History of the Fishes of the British Islands*, by Jonathan Couch, F.L.S., Vol. i., p. 27.

attached to a chain eight or ten feet in length. Sharks are however very wary and suspicious fish, and though they will often follow a ship for days, still they sometimes will not readily take a bait. An old sailor's dodge on such occasions is to lower a boat, and go as if to take it up, and the shark fearing to be balked of his prey will then sometimes suddenly swallow it. This fish is an occasional, but fortunately, a rare visitor to the British coasts. There is, however, another known as the "Basking Shark" (*Squalus Maximus*) sometimes called the "sun-fish,"

"which is the largest of all sharks, and of all true fishes." "One was seen by Mr. Yarrel at Brighton of 36 feet, and one was taken in Cornwall, 31 feet 6 inches. These fish perform a regular migration along the west coasts of Ireland, where they are taken on the Sunfish Bank, situated about 100 miles west of Clew Bay. They are found in May and June on this bank in great numbers. While they lie motionless on the surface basking in the sun, their large dorsal fin rises three or four feet out of the water. At this time they are easily approached and struck with the harpoon." *

These fish, however, though much larger, are not the dangerous enemies white sharks are. The basking shark is said not to be a voracious fish, and is neither to be enticed nor caught by the same bait or mode of fishing as the other. It is sought after and killed, like the whale, principally for its oil, which is extracted from the liver of these sharks, some of the largest of which will yield as much as 1600 lbs of oil. †

On the northern coasts of Norway there is a regular shark fishery, where four kinds of shark are captured—

* *History of the Fishes of the British Islands*, by Jonathan Couch, Vol. i., p. 65.

† *The Commercial Products of the Sea*, by P. L. Simmonds, 1879, p. 230.

the sun-fish above alluded to, the Greenland shark (*Squalus Glacialis*) and two other smaller kinds. The length of the Greenland shark varies from ten to eighteen feet; the baits used are either porpoise or salt blubber, and like the sun-fish these fish are taken for the oil extracted from the livers. * In Australia, the Government of Victoria having offered rewards for the capture of sharks, their numbers were so great that in one week, in May 1877, over 3500 sharks were captured by the fishermen of Sandridge; some of them earned from £3 to £4 a day. One immense shark measuring between fifteen and sixteen feet in length was caught in the bay. †

In nearly all the tropical seas sharks are numerous, and it is very dangerous for bathers to enter the water, no matter how close they may keep to the shore. We desire to mention this because we have seen large sharks within a few feet of the land, where there was barely water to float them. They will also go into harbours crowded with shipping, and swim fearlessly about beneath the keels. They are frequently plainly visible at anchorages where the water is clear.

A few hints as regards the tackle and baits used in sea fishing will complete this branch of the subject.

Hand-lines are generally wound upon square frames with projecting corners. Before putting fishing lines of any kind into use, "take the tangle out." This is done by wetting them and extending them full length across poles or branches of trees, and attaching weights to each end to allow them to untwist themselves as far

* *The Commercial Products of the Sea*, by P. L. Simmonds, 1879, pp. 226—233.

† *Ibid.*, p. 334.

as is necessary. While it is of course very desirable to have strong lines, it is better not to have them unnecessarily thick, as they are then so much acted upon by the water, in a tideway, that heavier leads are required to keep them down than if they were thinner. All lines should be tanned to prevent their rotting; take "half a pound of catechu and a handful of oak bark to three pints of water, and boil until the catechu is dissolved—the lines to be tanned are to be soaked in this for twenty-four hours." *

As regards *hooks*—all hooks should of course be tinned to preserve them from the action of the salt water, and hooks with eyes are far superior to the old plan with the shanks flattened out at the ends.

The material to which sea hooks are attached is termed snooding, and forms a very important part of the gear. It may consist of various materials according to the purposes for which it is intended, such as twisted hair, single or twisted gut, silk, hemp, flax, gimp, or wire. Copper bell wire makes a capital and cheap snood or trace for fish with sharp teeth—and all swivels used should be of brass.

Chopsticks are required for hand-line fishing. As sea lines mostly carry more than one hook, these chopsticks are required to prevent them from fouling. They should be made from tinned iron or brass, though whalebone and wood are sometimes used. They should always be detachable from the leads for convenience of carriage; admirable "improved detachable chopsticks" of this kind are made by J. N. Hearder of Plymouth, an extensive fishing tackle manufacturer, and others.

Leads for fishing are made of various shapes and

* *The Sea Fisherman*, by J. C. Wilcocks, 1868, p. 46.

sizes, but the conical lead, shaped like a ship's hand lead, is probably the best for bottom fishing, and an egg or pear-shaped one for fishing under sail. A strong brass wire should be cast into the lead to form eyes for attaching to the line. Leads vary in weight from half a pound to eight or ten lbs, and should in all cases be detachable from the gear for convenience of carriage for a traveller's use. Boat-shaped leads are made and recommended by Hearder of Plymouth. For deep-sea cod-fishing, a lead sinker of from $5\frac{1}{2}$ to 7 lbs weight * is required. Travellers however should not encumber themselves with leads. It is best to cast them as required from wooden moulds set in clay or sand, which are easily made of any form and size that may be required. A useful small lead can be readily cast inside the empty shell of an ordinary hen egg, and a larger one inside a goose or turkey egg.

In deep-sea fishing, as the hauling up of lines from great depths with a heavy sinker is very laborious, a small three or four inch snatchblock is therefore very useful in lightening the haulage. These blocks have an opening at one side into which the line is placed, and they can be hung to any part of a fishing boat's rigging. The block should hang about shoulder high for easy hauling. †

A good gaff or two will be required; for the smaller fish one of the larger sea-hooks, lapped on to a stick, makes a good one; but for heavy fish a stronger one is wanted; the steel part only need be carried and this can be lapped on to a staff when required for use. The end of the shank in this case should have a short

* *Deep Sea Fishing*, by E. W. H. Holdsworth, 1874, p. 146.
† *The Sea Fisherman*, by J. C. Wilcocks, 1868, p. 45.

"tang" bent back at right angles, which is let into the staff and so renders its pulling out impossible. For fear of accidents, protect the points of gaffs with a cork.

Almost every item of this sea tackle we may add, is good for use in large inland rivers or lakes except the heavy leads. Nothing does better than the hand-lines used at sea for boat fishing in large lakes, either while bottom fishing or when sailing with a line trailing behind the boat. The smaller classes of sea-hooks also suit admirably for every sort of fresh water fishing. A length of "long-line" same as that used by sea fishermen does good work in fresh as well as in salt water. Every sort of fish may be caught in this way, especially large quantities of fine eels, which in clear water, prove excellent eating.

The subject of baits is a large one. Among all the various forms of animated nature there is probably no class of creatures that prey upon each other more generally than fish—in fact it may be said that as a rule the principal food of fishes consists of fish.

"It is rather remarkable that some of the baits in general use, and which are undoubtedly attractive—mussels and whelks for example—are just those particular kinds which can form but a very small or probably no portion of the natural food of the fishes which take them." "This would seem to point to the advantage of a more general use of fish bait." *

Probably mussels, whelks, etc., are taken as some sort of fish, as are also the slices of fish skin cut off freshly caught fish, which make such excellent baits for mackerel and whiting fish. There can be little doubt that their companions take them to be some

* *Deep Sea Fishing*, by Edmund W. H. Holdsworth, 1874, p. 4.

sort of small fry. Any kind of fish in fact, of a bright silver colour, makes good bait, as also in some cases do cuttle-fish, squid shrimps, prawns, crabs, sand eels, etc. There can be no doubt of the fact that the principal food of fish is fish, and that the whole extent of the ocean is one vast slaughter-house, the strong preying upon the small and weak with true cannibal zest.

Good bait of some kind is also obtainable on almost every beach, when the tide is out. Shell-fish such as cockles, whelks, limpets, clams, etc., all make excellent bait. On sand banks lug worms can be dug up in quantities in most places, the worm-casts on the sand showing where a worm is working beneath. In like manner rag worms are obtainable on mud banks; ordinary lob-worms dug in the field also do for sea fishing; so do pieces of the entrails of chickens and other birds. When sand eels can be obtained they are particularly valuable as bait; these delicious little fish are however only found in certain localities, generally on the extreme outer edge of mud or sand banks, close to the tide at low water. They have to be dug up with forks, and in some places hundreds can be got in a short time at dead low tide. They are particularly fine in Australia, both in Victoria and New South Wales. The tails of fresh water eels also come in very valuable as bait; so do any kind of small bright fish, like dace.

As regards artificial baits for sea-fishing, the fishing tackle shops furnish many varieties, like rubber sand eels and such like. We cannot say we ever found them very efficient. By far the best of all artificial baits for sea fishing is the spoon. They however require constant cleaning to keep them bright, as seawater is

apt to tarnish them. On the coast of British Columbia the most splendid salmon and cod fishing is in the present day, as we understood, obtained in the Straits in autumn with spoon baits—the most approved pattern being a large brass spoon, three and a half inches by one and a half, trailed after the boat either with a strong rod or by a hand-line. *

River and lake fishing in its highest excellence is generally only to be had in wild countries; for just as game becomes scarce and wild in a country which is constantly shot over, so fish in the same way become diminished in numbers, at all events harder to catch in waters continually fished in. In many of the Norwegian rivers for instance, so celebrated for their salmon fishing only a generation ago, the sport has fallen off so greatly of late years, owing to set nets, and other enemies of destruction, that many of the leaseholders are giving up their fisheries in disgust. There can be no doubt that in this instance the deterioration of the fisheries is due to the destruction of the fish. Upon the vast continent of America however (though even there fishing is not what it used to be) first-rate sport can still be obtained. The fishing in many noble streams, however, has been destroyed by saw mills, the sawdust being in many many cases wantonly cast into the water, in defiance of the American laws, † thereby poisoning or driving away the fish.

Salmon fishing in America is, however, now greatly run after, much as it is in Europe, and though grand sport may still be had in New Brunswick and Canada, nearly all good rivers, readily accessible from the

* *Forest and Stream* (American sporting paper) of November 1, 1888.
† See Report of the U.S. Fish Commission.

settlements, are now preserved, the fishing being let to Anglers' Clubs or private individuals; but for those who can go far enough to seek it there must be plenty of good fishing still free in the immense territory of Labrador and in the rivers running into James's, and Hudson's Bay; also on the Pacific coasts of the great North West—but mosquitoes are terrible in these regions.

America is also renowned for its white, or sea-trout fishing. When there is a run of these fish, the best places are at the sea, near the mouths of rivers, and on the edges of sand flats at half tide; but these trout ascend many miles up the rivers at certain seasons, exactly as the salmon do. Admirable sport may also be had in tide rips and other narrow passages in salt water where the current runs strongly.

Then there is the great inland lake-trout, which is to all intents and purposes a fresh-water salmon. The fishing for these trout at Sault St. Marie, the outfall of Lake Superior, and at the Island of Mackinaw, has long been celebrated. At Mackinaw these gigantic trout are often taken in considerable numbers in the deep waters of the lake, the water being so marvellously clear, that up to fifty feet in depth the movements of fish can be distinctly seen at the bottom, and Mr. Lanman states that the Mackinaw trout has been taken up to four feet in length and fifty to sixty pounds in weight. *

Gigantic trout are also taken, as large as salmon, in the rivers and lakes of Finland and Swedish Lapland, and Siberia contains many fine rivers which so far as rumour can be trusted, seem likely to be some of the great fishing waters of the future.

* *Adventures in the Wilds of North America*, by Charles Lanman, 1854, p. 253.

Those who are contented with trout of more ordinary size will find plenty of splendid fishing in North America. Speaking of the fishing at Sault St. Marie, Mr. Lanman says, "We have known two fishermen to spend an entire day at one anchorage and capture more than a cartload of the spotted beauties, varying in weight from half a pound to three or four pounds." * The spoon fishing in Lake Superior is also splendid at times.

"Large fish abound in this great lake (Lake Superior) and the largest trout are caught by it (the spoon). The size to which the fish grow in that inland sea is likewise remarkable. Mr. Mackenzie, the officer in charge of the Hudson Bay Company's post at Fort William, took a trout in a net at the close of the fishing season of 1858, which weighed eighty pounds, and a French half-breed caught one of nearly the same dimensions." †

An idea of the splendid fishing to be had here may be gathered from the report of the fishery overseer for the district of Lakes Huron and Superior for 1859, from which it appears that in September 1858 John Finlayson, a subordinate officer at Fort William, with a common spoon caught, in two and a half hours while paddling four miles along the coast between Pigeon River and Big Trout Bay, seventy-four trout averaging five pounds each, till he was tired of pulling them in, and said he could have filled his canoe two or three times over; and on September 27th 1859, on the shoals between Horse and Yeo Islands, Joseph Tondeaux with a common spoon and a railway spike for a sinker, caught while sailing, one hundred and fifty-two trout in six hours. They averaged eight pounds

* *Adventures in the Wilds of North America*, by Charles Lanman, 1854, p. 251.

† See Professor H. G. Hind's *Travels in Labrador*, 1863, Vol. i., p. 267.

each and some of them weighed sixteen pounds. In 1858 on the same shoals, an Equirico Indian in one day caught 250 trout of about the same weight. In October 1859, E. Bonchier, of Vails Point, in two hours caught 58 trout; and on the 27th of the same month, among the islands at the entrance to Georgean Bay, Indians and half-breeds were catohing with trolling lines two or three barrels per day. *

Professor Hind in his account of the Exploring Expedition into Labrador in 1861, represents the trout fishing there also as splendid, and states that in the great lakes of the table land of Labrador immense trout are found often sixty pounds in weight. † These great fish, he says, are constantly taken by the Indians in winter, who catch them from under the ice, which is not unfrequently five or six feet thick, and during the summer months fine crimson spotted trout of medium size, leap "wildly at a gaudy fly," of which kind the Professor's party caught 120 in one evening on Cold Water River. § Indeed the streams and lakes of Labrador seem to be full of them, and since the time when these great takes of fish are recorded, there is little probability that the fishing has materially fallen off, as the extent of water is so enormous and the settlement of the country in these districts has hardly yet begun. Mosquitoes however are very bad there.

Along the track of the Canadian Pacific Railway also splendid fishing, according to Mr. Caine, M.P., can be easily obtained still, both in the streams that run into Lake Superior and in Manitoba. The beauti-

* See Professor H. G. Hind's *Travels in Labrador*, 1863, Vol. i, pp. 267—8.

† *Ibid.*, Vol. i, p. 107.

§ *Ibid.*, Vol. i, p. 143.

ful stream Kaministiqua, for instance, is stated to be "a river which makes an angler's heart ache with envy as he views from the train its almost virgin stream." "At one of the lovely stopping places I asked the station master if he ever fished the river. 'Occasionally,' was the reply and he added, 'I could catch as many trout as I could catch grasshoppers for bait. I suppose I could bring home 150 or 200 in a good day's fishing, weighing about 120 lbs,' and the general appearance of this stream, Mr. Caine assures us, makes this statement quite credible." *

Nevertheless, Mr. Caine, on whose authority the foregoing statement is given, in common with all anglers, sometimes found the fishing disappointing. On the Bow River, a celebrated fishing station, for instance, he tells us, "I tried every fly in my book, but could catch nothing. A youth that came along informed me that 'It was no use trying them things, guv'nor, you try a bit of beef.' The fly, as all experienced travellers are well aware, does not do well everywhere; natural baits, bits of meat, and above all, the *spoon*, often do infinitely better than any fly, and Mr. Caine goes on to say that he

"heard of wonderful fish being caught in Devil's Head Lake, ten miles from Banff, and saw a man who had caught seventy-seven trout there weighing 220 lbs" (showing an average weight of about three lbs. each) "in a single day, trolling with a couple of hand-lines and spoon bait. One trout weighing forty-three lbs. was caught there last year with a piece of beef. But a young Englishman rode over during our visit and did his best, but never saw a fish of any kind." †

* *A Trip Round the World* in 1887—8, by W. S. Caine, M.P., p. 42
† *Ibid.*, p. 76.

This is a good illustration of the uncertain habits of fish alluded to in the opening part of this section, and is a thing which often happens. Improper baits are used by strangers who don't know the water, or they go at wrong seasons or hours and catch nothing, and very likely go away cursing the place, and representing all reports about good fishing there as being fictitious. The author of these pages has himself many times experienced these disappointments, in trying unknown waters in wild countries, until he has been quite disheartened; then perhaps he has either discovered the proper mode of procedure from natives, or has at length himself hit upon some successful expedient, and once this was found out, plenty of fish were easily taken.

In his experience in many waters, flies are at the best very uncertain, and worms very often can't be found. But grasshoppers, local beetles, grubs, etc. of some kind may be looked for and tried, and failing that, a bit of any kind of liver or lung, or a bit of meat, a shred of white pork rind, all come in well at times. Also of course small fish, when they can be had, generally prove good baits; but far and away the best, the most portable, most reliable, and durable of all baits both in fresh and salt water is the spoon. Never be without a good outfit of them, of all the different sizes in ordinary use. Avoid the expensive and often useless forms of artificial minnows and other fanciful baits which one sees advertised in sporting papers; all sorts and sizes of these articles are sold in fishing tackle shops, but in the author's experience, and he has tried many of them, they did not as a rule do well—very much the reverse.

Another celebrated fishing ground in North America

is the Minnesota Lake Country, on the head waters of the Mississippi. This immense district is a country filled with lakes, and tracts of rocky forest; chains of these lakes, some small, and others several miles across, are very generally connected by streams, so that a canoe can make its way through a score or more of them, and then by a short "carry" be launched upon a different series. All these waters are stated to be full of the finest fish: trout, bass, pike, pickerel, mascalonge, etc., and they also abound with wildfowl.

Mr. Ernest Ingersoll, in a letter in *The Field*, * states that he "is inclined to think that no better fishing can be found than in the Minnesota Lake country; and at every village and lumbering camp, guides, boats, and camp outfit can be obtained. The expenses of living are very light, and the whole region healthful and invigorating in the extreme." The author however thinks it right to add that when he passed through Minnesota many years ago *en route* to the Hudson Bay Territory, though fishing and shooting were good, mosquitoes and other flies were a terrible nuisance. They swarmed in myriads, and formed the only drawback to a really lovely country. This lake country extends far to the northward into the British Territory, where extensive morasses and swamps become more common, but fish and game of all kinds abound, as also do the mosquitoes. The larvæ of these pests are, it is now generally believed, hatched in water, like the May-fly and the Caddis-fly, and it is notable that the larvæ of mosquitoes as well as the fly itself form a considerable item in fish food.

This plague of flies however seems to be common

* See *The Field* of July 19th, 1890—letter signed Ernest Ingersoll.

to all wild countries where water is abundant, especially where there is much ground of a swampy nature, doubtless because there is nothing to disturb the hatching of the larvæ. At all events it is certain that the movement of human population, with their attendant domestic cattle, etc., has the effect of greatly minimizing this plague, but still it is not enough in itself to extinguish it, for many large cities in tropical lands are still mosquito-stricken, and gauze curtains to enclose beds at night continue to be an absolute necessity. In the primeval woods, however, in the long grass prairies, and on alluvial flats along the edges of rivers, and the inland waters in wild or semi-wild countries, the nuisance of flies assumes quite the proportions of a veritable plague, and renders them the bane of the fisherman's existence, for wherever there is water, there these insect pests swarm in the greatest abundance.

The question of insect pests of various sorts is one on which volumes could easily be written, therefore we must be very brief in treating of such matters here, and shall confine ourselves to pointing out what steps the fisherman should take to protect himself as far as possible from their annoyance.*

In the first place we may state that there is no ointment or lotion which, so far as our own experience goes, is of the least service in protecting exposed hands and face. The number of nostrums that have been proposed as useful are endless, and we have made trial of many, but we regret to say we found none of them serviceable. The attacks of flies still

* We had written a chapter upon "Insect Pests" as seen in wild countries, but the great length of this work has obliged us to omit it.

continued, notwithstanding the alleged certain cures that had been vainly tried.

There really remains therefore but one alternative for the fisherman, and that is to cover the hands and face by mosquito netting fine enough to exclude the finest insect enemy. This is the cheapest, best, and the *only* effectual plan. A broad-brimmed wide-awake hat must be worn; around it must be fixed a veil, or bag of this netting. This must be closely fitted with a string to the hat, so that nothing can get in there, and the lower end of it should be tucked carefully in under the coat collar and vest. Nothing can then attack the head. This is a nuisance in close, warm weather, it must be admitted, but there is no alternative in a really fly-stricken district. The hands, of course, must in the same way be protected by long and stout gauntlets: the sleeves made fast above: and the trousers by gaiters below. That being carefully done the fisherman may bid defiance to flies. Mosquitoes can now only attack on spots like the knee or shoulder where the clothes fit tight, and in case of need such spots can, and should be, guarded by padding. In broad waters mosquitoes will follow a boat a long way from land. If however, there is a wind, they will not attempt this, and by rowing out some little way from land, and then returning to the fishing ground, these pests may, when there is a breeze, be effectually got rid of for the time, and the net can be put up and wound round the hat. Near the water there are not only mosquitoes, but minute black and other flies, which at certain seasons are very troublesome; but they mostly stay near the cover of bushes on the banks, and seldom venture out far upon the water if there is a breeze, or rains.

When much sitting is to be done in boat work, an inflatable ring, as an air cushion, is, as we before remarked, extremely convenient and comfortable on hard seats. In rain or spray, nothing affords such complete protection to the knees as a waterproof petticoat and short waterproof coat. These with a pair of rubber knee boots ensure the fisherman against damp. A long waterproof coat of the usual kind is not nearly so effective, and it is apt to get torn and spoilt.

Fishing is for the most part carried on in cool climates, sometimes in very cold weather. In such cases nothing affords such perfect protection against piercing winds as waterproofs. At sea they are an absolute necessity, spray and the drip, from the hauling in of lines, soon wetting clothes completely through.

In cold weather when people are at sea in open boats, hot coffee and soups are very comforting. We shall therefore add some specific directions for fires at sea, or for boat travelling upon inland waters. If the boat is fairly roomy, as sailing boats generally are, a fire can be kindled with perfect safety in all ordinary weather by depositing on the floor of the boat a layer of stones; on top of which a bed of damp blue or other clay, can be laid; upon this a fire can be lit. Any ordinary camp cooking can then be performed. This rude fireplace can be made hollow in the centre to prevent hot embers falling out; peat turf, charcoal, or ordinary coals can be used as fuel more conveniently than billets of wood, on acount of the bulky nature of the latter.

If the flooring boards are removed, the stones can be laid on the boat's bottom, and if there is a little water washing about on it, so much the better. The stones etc., come in useful as ballast under sail. If

you wish, however, to have it on the floor, it is better to have some rough sea-weed or moss under the stones and packed around them, which should be kept wet. Thus with common care and intelligence nothing can be injured by the heat. The fishing hookers on the west coast of Ireland all use this plan and burn peat turf. We have many times made coffee and cooked fish while at sea in this manner, very comfortably. In canoe or boat journeys on rivers, of course, it is usual to land. If a sand bank can be found in mid-stream land there; because there the traveller is less likely to be worried by flies than on the shore, and dry banks in mid-stream also generally supply enough drift wood for a fire.

There are doubtless many good cooking stoves and other devices suitable for boats of various sizes, to be bought in the shops, but in wild countries these things are not always to hand; and if they were, we doubt very much if in the end any great advantage would be found in practice over the makeshift fire-hearth we have suggested, which as we have stated, is an old Irish device, simple, cheap, and efficacious.

Irrespective of the ordinary risks which must be necessarily incurred by all whose business or pleasure takes them far from land, the fisherman on large inland sheets of water must be prepared for the chances of being overtaken by storms, while crossing, or trolling in, extensive lakes. We think it desirable to mention that even on the ocean itself, there is nowhere that a small boat may have to face a more dangerous sea than sometimes suddenly gets up upon lakes. Heavy squalls at sea are of course almost

everywhere common, but one of the most dangerous ocean fishing grounds we have ever seen is probably in Table Bay, at the Cape of Good Hope. Here boatmen have to be constantly on the look-out for dangerous squalls, and sudden wind storms of great intensity, arising during mid-summer with a cloudless sky. These gales are of entirely local character; it may for instance be a perfect calm on shore, and yet one of these storms may be seen raging across a belt of water, not more than a mile from land. There is most excellent fishing to be had in Table Bay, but boats used for fishing in such a place, and the men who work them must always go out prepared to meet one of these sudden emergencies. On lakes however, the boats are seldom what could be called "good sea boats," yet local squalls descending ravines from hills etc., are on some lakes of an exceedingly sudden and dangerous character. The waves rise exactly as at sea in a few moments, but frequently to our mind assume an even still more dangerous aspect than an ocean sea-way in a similar time. Fresh water waves, very short and irregular, seem to come tumbling in from all sides, much like water in a pot that is boiling briskly. A storm upon a large lake is therefore no joking matter.

If we might venture to hazard a conjecture as to why waves should rise more quickly in fresh than in salt water, we should say it is because of its lesser weight, or specific gravity, which stands at 1000 for fresh water, as against say 1026 for sea water; * and

* The specific gravities of ocean water in the North Atlantic vary from 1026 to 1028·5, being least in the Equatorial region of constant rains from Lat. 15° N. to the Equator, and greatest in the region of minimum rainfall, Lat. 25° to 30° W. (see *Encycl. Brit.*, 9th. Edit., Vol. xxi, pp. 613—14. Art. "Sea Water").

the seas are *short*, that is, follow each other in very rapid succession, because the expanse of water on which they are formed is restricted. Thus in narrow sea channels there is always a short chopping sea, whereas in mid-ocean there is a much longer interval between the waves.

These peculiarities always render going out in small boats under sail on lakes, especially in mountainous districts, a more or less risky matter. In these cases on no account should the sail be made fast, but should always be either held in the hands or so regulated that it can be instantly cast loose. This will at all events minimize the risk of an upset from squalls. As regards the risk of being overtaken by a sudden gale, the only thing that can be done is not to go so far from shore as to prevent a rapid retreat to land in case of need, and above all to get into the habit of constantly watching the sky, and observing the movement of the clouds. If there are mountains, watch the cloud caps if there are any, and whether there is any appearance of flying scud driven up by squalls or gales, setting in upon their reverse slopes, In Table Bay for instance, whose terribly squally nature we have just mentioned, more or less warning may almost always be had by the formation of clouds upon the summit of Table Mountain, and the occurrence of rapidly flying scud, or mist sweeping over its top or round the shoulder of the hill. This celebrated mountain, we may observe, rises abruptly, almost directly from the margin of the great Southern Ocean to a height of nearly 4000 feet over sea-level. * The city of Cape Town nestles at its foot,

* See Brown's *South African Guide* for the use of Sportsmen, Tourists, etc., (London) 1893, p. 123. "The Devil's Peak" a rocky cone

and most of its streets rise steeply from the water's edge; its beetling precipices rise almost perpendicularly immediately behind the houses; severe storms in the dry season are always attended by intense whirlwinds of dust in its streets, which render locomotion, to say the least, disagreeable, not only sand but small pebbles being driven against the face.

Thus we see that even in this phenomenally stormy region there is always some warning, provided people keep a sharp look-out for indications of danger. It is so almost everywhere: lives are lost, in general, through simple want of care and because no look-out is kept. In the open sea, of course, the advance of a heavy squall is indicated by the white-topped waves, and a good officer has generally time to let go his sails before his ship is struck by it. While we were at Cape Town, a notable instance of want of care in such matters took place. A coasting schooner proceeding eastwards was suddenly struck by one of these violent squalls of which we have spoken. She was blown clean over in an instant, and turned bottom up. Out of a crew of seven men on board, if we remember rightly, either five or six were drowned. The survivor or survivors clung to the keel, and were rescued in a very exhausted condition, when hope seemed to have almost fled.

In navigating large lakes therefore, in canoes or open boats, these elements of risk should never any more than at sea be lost sight of. Ancient records show, for instance, that the American Red Indian tribes inhabiting the shores of the great lakes always journeyed along the margins

3300 feet high to the left of Table Mountain was known to the early navigators as "The Mountain of the Winds."

parallel with the shores. In fine weather they perhaps crossed from one headland to another, but otherwise, though past masters in the art of managing boats, they rarely ventured far from land, and never (except perhaps on a war party) travelled by night. This latter is a thing travellers are rarely justified in attempting upon unknown waters, on lakes because of storms, or on rivers because of dangerous rapids. It is always prudent and better in every way to land and encamp for the night. If it is desired to prevent strangers finding the camp, this can be effected by travelling close to the shore for some time after dark, and then landing and retreating a little way into the bushes. This is however seldom necessary.

Camping on islands situated in extensive lakes is also a bad plan where it is not absolutely necessary. Instances have frequently been known of storms springing up by night, and parties of travellers being detained in these places for days before they could venture to re-embark, while food running short has caused them to be nearly starved before they could effect their escape.

On the other hand, nothing can be more delightful under favourable circumstances than a canoe voyage along fine lakes and rivers. In a great forest country like North America, the streams literally form the liquid highway of communication. There are lovely vistas of river scenery; their banks (in former days at all events) generally teem with four-footed game and land birds, while their surfaces are even still frequently covered with flocks of aquatic fowl, and a vast abundance of magnificent fish swarm in shoals beneath the current, or disport themselves upon the shallows. The

native tribes settled upon their margins, in ancient times lived for the most part, except in far northern regions, a life of fairly easy abundance. At all seasons game and fish abounded, and throughout the summer and autumn wild fruits of excellent quality grew profusely in every open glade. On the great rivers of South America and Africa, reports of travellers show that very much the same conditions existed. There was just one drawback to this picture of this earthly Elysium, formerly found in the North American wilderness—the human tiger lay in wait for the unwary, and perpetrated hideous barbarities upon the unhappy man who was so unfortunate as to fall into his clutches. Truly in this wilderness the most dangerous of all beasts of prey is the savage man, who is continually lurking in some secret hiding place to destroy his own species, where in the dramatic words of Bishop Heber, "Every prospect pleases, and only man is vile." *

Another branch of the angler's art deserving of notice is that relating to the different kinds of fishing obtainable in tropical countries. The nature of the climate and the malarious influences which are supposed to exist in the neighbourhood of water, in these lands, have in general to a great degree prevented Europeans from doing much in the way of fishing.

Very fine sport is however often to be obtained by those who care to seek for it; and as a source from whence supplies of food may be drawn by parties of travellers passing through wild countries, the question of fishing may occasionally become one of considerable and indeed paramount importance.

* Part of two lines of a missionary hymn, by Bishop Reginald Heber (of Calcutta)—(*tempo* 1783—1826).

Public attention, for example, has of late been constantly directed to the unfortunate history of the hardships and sufferings undergone by the ill-fated rear column of the Emin Pasha Relief Expedition in Central Africa. In this case a large contingent of natives were encamped for months under the command of European officers upon the banks of the Aruwimi, a noble river. It will be fresh in the memory of everyone that their sufferings and losses were mainly attributed to bad and insufficient food, and idleness; yet there is no record of any organized attempt to utilize the supply of fish which existed at their very doors, though goods were on hand to exchange for fish and other food supplies, which is conclusive as to plenty of fish being there.

In an extensive and well-equipped expedition of this kind, the formation of a depôt of stores in the rear of the main party, to which they could fall back in case of disaster, or from which they could replenish supplies as they became exhausted, was an obvious measure of precaution to which a competent leader would resort as a matter almost of course; and the advantages of water carriage would naturally render its location upon the banks of a navigable river imperative. This must have been evident from the first, and there can be little doubt that all these African rivers literally teem with various forms of aquatic life: for just as nature has endowed the tropical jungle with boundless wealth of production, so in like manner she has almost everywhere been equally profuse in her dealings with the inhabitants of the waters; and probably in no way could the idle or weakly hands in the camp at Yambuya have been more usefully employed than in setting them to work at a fishery.

We say this without the slightest desire to act the part of an adverse critic, or to minimize in any way the many difficulties which surrounded the officers in charge upon this disastrous occasion.

But to be able to utilize the resources of such a river, it was of course necessary for them to have possessed adequate supplies of nets, and other fishing tackle, the extra carriage and expense of which would however have been comparatively trivial.

Large fish no doubt could have been taken in considerable quantities in suitable nets, while a small meshed net would have supplied small fish for baits, and the resources of the surrounding bush would have supplied many other kinds of bait for fishing lines. Fishing nets form a very useful part of a traveller's outfit, as all experience shows.

The records of African fishing are of course for so far, however, singularly meagre, but it is known that extensive and successful fisheries are carried on by the natives resident on the borders of the Central African Lakes, and that throughout Central Africa fish is a large and universal article of trade. Whenever travellers make any allusion in their books to the subject of fish and fishing, it is always to mention the fact that the African rivers and streams abound with fish. Emin Pasha himself says so in several places in his book. Of the Yalo river for instance he states, "the number of fish it contains is quite marvellous." *

Let us however take the case of one of the very last localities where a fisherman would probably think of

* *Emin Pasha in Central Africa*, a collection of his letters and journals, by Professor Schweinfurth and others, translated from the German by R. W. Felkin, 1888, p. 326 and 396.

going to look for fine fish, namely the almost completely desert countries traversed by the Nile and some of its principal affluents. We are indebted to the graphic pen of Sir Samuel Baker for a most interesting account of the sport obtained by him in one of these—the Atbara—which flows for an immense distance through the desert. In no place, he says, was the river bed less than 400 yards wide, "but the river was dead, not only partially dry, but so glaring was the sandy bed that the reflection of the sun was almost unbearable." In June, at the time he speaks of, even the very grass upon the desert had turned to dust:

"Nevertheless, at intervals (Sir Samuel Baker states) were many pools of considerable size and depth; these holes become reservoirs of water when the river is exhausted, and in such asylums all the usual inhabitants of the large river are crowded together in a comparatively small space. They are positively full of life; huge fish, crocodiles of immense size, turtles, and occasionally hippopotami, consort together in close and unwished-for proximity." *

One evening, he tells us, he strolled down to the margin of one of these pools to fish. His "rod was a single bamboo," and he had "a very large reel with nearly three hundred yards of line that had been specially made for monsters, and a powerful hook fitted upon treble-twisted brass wire."

"There was a difficulty (Sir Samuel Baker goes on to say) in procuring bait; a worm had never been heard of in the burning deserts of Nubia, neither had I a net to catch small fish" (such as the author of these pages has suggested to be carried as a most useful adjunct to a traveller's outfit). "I

* *The Nile Tributaries of Abyssinia*, by Sir Samuel Baker, 1867, p. 34.

was therefore obliged to bait with pieces of hippopotamus. Fishing in such a pool as that of the Atbara was sufficiently exciting, as it was impossible to speculate upon what creature might accept the invitation; but the Arabs who accompanied me were particular in guarding me against the position I had taken under a willow bush, close to the water, as they explained that most probably a crocodile would take me instead of the bait; they declared that accidents had frequently happened when people had sat down upon the bank, either to drink with their hands, or even while watching their goats."

This is a danger which it is by no means prudent to make light of, and which has constantly to be guarded against in approaching or crossing many of these tropical rivers, where the fisherman may go to catch some of the inhabitants of the waters, but where they may sometimes turn round and catch him. Nevertheless Sir Samuel Baker proceeded with his fishing, and soon caught a respectable dish of fish of a species of perch called "boulti," which is considered one of the best Nile fish. He then changed his bait to a piece of one of these "boulti" about four ounces weight, which glistened like silver, and it was taken by a turtle of at least 100 lbs weight, but after a long struggle the creature broke away by cutting the thick, treble-twisted brass wire trace. * Later on in the course of his journey, in the month of September, he had some splendid sport higher up the course of the Atbara, near its juncture with the Till, a small tributary stream. He had a good supply of tackle, and fitted up "a beautiful straight and tapering bamboo that had been brought down by the floods" as a rod,

* *The Nile Tributaries of Abyssinia*, by Sir Samuel Baker, 1867, pp. 39—41.

and fished with a live bait upon a set of treble hooks, and used a large float.

Presently the bait was seized by some monster and the line broken. Replacing the hooks with a still larger set, a "bayard" of about twelve pounds weight was caught and two others of smaller size. A day or two afterwards he tried again and caught a "bayard" of at least forty pounds, then another of nine pounds, and later another of upwards of sixty pounds, all caught with a live fish bait and a float.

On another occasion he caught a "baggar" of fifty pounds, a splendid fish like a clean run salmon in colour. This beautiful fish is considered by the Arabs the best in the river, and Sir Samuel Baker says "is quite equal to a fine trout." * On October 4 he had particularly fine sport—first a beautiful baggar of forty pounds, then another magnificent one of between seventy and eighty pounds, and some others of less value. †

These details, necessarily abbreviated to a simple statement of results, show what can be done in some of the African rivers. In East Africa Sir John Willoughby took the very sensible precaution of carrying a seine net, and reports that with it—"we caught a good many fish from a few ounces to three or four pounds weight. The neighbouring river was full of fish, which helped our commissariat a good deal, as the porters were very fond of fish, especially after it had been smoked and kept a few days." §

Reports from South Africa, a dry country where little fishing might be expected, also furnish details of

* *The Nile Tributaries of Abyssinia*, by Sir Samuel Baker, 1867, p. 229.

† *Ibid.*, pp. 231—2.

§ *The Big Game of East Africa*, by Captain Sir John Willoughby, pp. 178 and 182.

successful results. On the Mooi River in the Transvaal, Mr. Parker Gilmore states that good fishing is to be obtained—"yellow fish and *Siluridæ*, erroneously here called barbel, are abundant, and grow to a great size." * Grasshoppers and locusts are much used as bait in this part of the world. In Zululand we have ourselves seen two very large baskets of fish captured in a day's fishing by two anglers on a small river.

In the Botletli river in the neighbourhood of Lake Ngami, excellent sport is reported by a late writer in *The Field* newspaper. With common hand-line and hook large "barbel," as they are called, were easily captured—thirteen fish over ten pounds each being pulled out by two fishermen in a morning's fishing. Perch of five different species, and a sort of bass were also caught, three and a half dozen of these fish of an average weight of two pounds being taken in about three hours. The baits for these latter were grasshoppers or the entrails of birds. Early in the mornings or late in the afternoons were the best hours, and then almost any sort of bait will catch barbel, and an ordinary sea-line and cod-hook baited with a lump of meat was found the most effective. †

From the Amazon, the Rio de La Plata, and the Parana in South America, splendid sport has also been reported. Near the juncture of the Parana and Paraguay rivers above Corrientes very fine sport is to be had, splendid fish called "dorados" (a species of gigantic goldfish) being taken at times in great numbers. These fish often run up to a great size.

Also, in India, the mahseer fishing (which lasts

* *A Ride Through Hostile Africa*, by Parker Gilmore, p. 132.
† Letter in *The Field* of July 19, 1890, signed J. A. Nichols.

from October to April) has long been celebrated; and one of the most scientific and best books on fishing that has ever been written is from the pen of Mr. H. S. Thomas, an Indian sportsman. * This book is well worthy of perusal by every fisherman and lover of natural history, even though they may never intend to fish in India. It is full of good suggestions and sound practical advice on the subject of fishing, and forms a regular *vade mecum* for every one who thinks of angling in tropical waters. The suggestions for the preservation of fishing tackle used in hot climates will be found specially valuable to anglers in hot damp regions. There is another work by the same writer on "Tank Angling" in India, which is also of considerable value.

As regards mahseer fishing, Mr. Thomas considers that

"a mahseer shows more sport than a salmon, and makes a better fight than a salmon of the same size. His attack is more impetuous and his first rush more violent. My prejudices (he states) were all in favour of the salmon, but the mahseer compelled me to believe in him, in spite of my prejudgment to the contrary, and as a table fish he is the best in Indian waters, and stands between salmon and trout for the table." †

The mahseer (*Barbus Mosal*) is a species of carp, and like the ordinary British carp is a bottom fish, and takes its food by suction. It has a leathery mouth without teeth, the teeth as is usual in the carp species being in the throat, so far down as to be invisible;

* *The Rod in India: Hints on Sport, with Remarks on the Natural History of Fish*, by Henry Sullivan Thomas of the Madras Civil Service, published Mangalore 1873.

† *Ibid.*, p. 10.

but the teeth in the mahseer's throat are unusually formidable and it has great power of jaw, so that it has been known to double a spoon in two, like a compressed piece of paper. * In some rivers these fish do not run above 10 or 12 lbs. but in others they have been taken 30 or 40 lbs. and even as much as 74 lbs. Curiously enough Mr. Thomas finds that—"in discoloured water you will not take a single fish; your best chance is when the river is clear as crystal, and just as you would consider the most unfavourable for trout and salmon. The clearer the water is the better the prospect of sport." † The angler has therefore, as Mr. Thomas reminds him, to be more careful to keep out of sight than in any other kind of fishing, and great attention must be paid to dress, so that there may be nothing to attract the notice of the fish. There can be no doubt that fish are able to see the movements of persons in a boat or on land much more clearly than most people seem to suppose; and while a fish is seen lying stationary in the water, he is in all probability intently watching what is going on above, ready to dart away at the first appearance of danger, as the angler will find if he makes any sudden movement.

Though mahseer will take a fly, Mr. Thomas considers the most killing of all baits is a fish from three to four inches long on light spinning tackle, but phantom minnows at least six inches long and the spoon are nearly equally good—the spoons to be from $1\frac{1}{4}$ to $2\frac{3}{4}$ inches in length in the bowl and to have one side silver and one side copper, and they should be

* *The Rod in India*, by H. S. Thomas, 1873, pp. 36—7.
† *Ibid.*, pp. 34—5.

of a somewhat heavier make than those used in England, as it is preferable to spin deep; and both spoons and hooks require to be extra strong, on account of the great power of compression possessed by the jaws of this fish. Indeed special hooks are sold for mahseer fishing in the London shops; and Mr. Thomas states that he—

"lost treble hook after treble hook, smashed sometimes before he felt any fish at all, crunched up by the mahseer's power of compression, and that the treble hooks suffered more than the single, because the single hook turned in the mouth, and evaded it." * While fishing for mahseer he says, "you must fish in constant preparedness for the sudden rush, as when a heavy fish goes off with racehorse speed, he will take no denial; if he cannot get line enough he will break it, but all being ready for paying out line at a moment's notice, it is not to be given gratis; toll must be exacted for every inch, by raising the point of the rod according to circumtances, and thus compelling the fish to bend it, before he can get the line to run; 45° or 50° represent the angle at which the rod will bear most strain. The moment he ceases rushing, wind up as vigorously as possible." †

No better advice than this can be given to the salmon angler, when playing a heavy fish. All we can add to it is to advise the young angler to keep cool, and whenever the fish springs out of the water, to instantly lower the point of the rod, so as to avoid any sudden jerk; and as regards gaffing a fish, though in the "Badminton Library," ("On Fishing for Pike, etc."), it is advised to put the gaff *over* the back of the fish, and then strike; with all due deference we should certainly advise fishermen on no account to do so. When a fish is ready for the gaff, hold him well up by the rod with

* *The Rod in India*, by H. S. Thomas, 1873, p. 38.
† *Ibid.*, pp. 12 and 13.

the left hand, the butt resting against the body, and pass the gaff *under* the fish—well below if there is water, and well beyond him, the point being towards the left and partly turned down, the hand being "knuckles up." When about to strike, turn the fingers up. This at once brings the point of the gaff into the right position, and a sharp draw towards oneself secures the fish. By adopting this course a fish will rarely be lost. A fish cannot see a gaff beneath him as he can one held over him. Lastly, allow no man to use the gaff for you, unless you know he can be depended upon to do it right.

Much more might easily be added on Indian and other sorts of fishing, were it desirable to extend this branch of our subject; but in a work of this kind, practical details with respect to tackle and other items of a traveller's fishing outfit are of more importance than mere records of successful days' sport by individual fishermen.

The selection of fishing tackle for a traveller's outfit involves a good deal of consideration, as what he ought to take will of course depend very much upon circumstances. Tackle that has to be carried about for any length of time in a manufactured state, as all experience shows, is apt to prove unreliable when exposed to the strain of a heavy fish.

In dry hot climates especially, the tackle usually sold in the English fishing tackle shops soon becomes worthless, owing to the wax of the whippings and tyings becoming dried up, and the hooks etc. *drawing*.

Moreover, with all tradesmen who have wares got up for sale, the main object is to get them to look neat and attractive to the public eye; and as a rule,

dealers will not sacrifice appearances to utility. The consequence is that a great deal of the tackle sold in shops proves too delicate to resist the strain it is subjected to when playing heavy fish, either at home or abroad, even without being kept until deteriorated.

It is therefore evident that it is mistaken policy for travellers to carry extensive assortments of whipped hooks, flies, artificial baits, or other tackle, in a manufactured state, and that it is in every way better merely to take the materials for preparing what is required for use, as wanted. It is true that tyings done by oneself may not look quite so neat as if done by a professional hand, but in general they will prove both stronger and more reliable than the purchased article.

The quantities and class of tackle which it may be prudent for a traveller to carry will necessarily vary so much, according to his means and intentions, that it will be desirable to confine our remarks to a few general observations upon each of the different items that usually go to make up an angler's outfit; for it is evident that every sort of fishing in turn may require to be provided for, in the case of travellers who intend to be constantly on the move, and about to visit many countries and climates in the course of their wanderings, while with others a few strong simple articles will meet all requirements.

We shall therefore offer a few suggestions respecting the various items which our own experience suggests as the most generally useful for anglers travelling in foreign lands—out of which we trust that those who deem our advice worth following will be able to select what they think will suit their own requirements best.

Rods are unhandy things to carry on a long journey. They are subject to many accidents in rough travel, and are not easy to repair, if subjected to injuries, such as the bending of a ferrule, the breaking of a joint, etc. The top, of course, is the part of a rod most subject to breakage. If the traveller carries an outfit of rods therefore, let him provide himself with several spare tops, as a reserve in case of accidents. A fly fisherman will find a good strong trout rod a *sine qua non*. Avoid the light, easily injured, delicate things fishermen sometimes prefer, as being "light and handy" in the home waters. When a man is far removed from a fishing-tackle shop, he wants something more substantial. The author possesses such a one now, which after thirty years' service, from time to time, in many lands, is still (with some occasional repairs of course) practically as good as ever.

For trolling with natural baits or spoons, good strong salmon rods are invaluable. They can have fly tops for fly fishing, but should have shorter and stouter tops for spinning. It is a good plan to have two of these rods, with the joints interchangeable, about 18 feet long when the fly top is put on, and made in three pieces. Have plenty of spare tops, and a spare middle joint. Carry some spare rings to replace defects.

The regular trolling rod for pike fishing usually sold in England is too short and not flexible enough, and the stand-up rings are very subject to injury while travelling; a large fish can be more safely managed on the former than on the latter, at least that was the author's experience.

Capital makeshift rods can however he made by a handy man, and bamboos are unrivalled for this purpose.

Mr. Thomas in "The Rod in India" says with regard to them—

"Rods made of bamboo reeds are supplied by the forest, cut in seventeen or eighteen feet lengths, tapering from an inch in diameter at the base, to one-eighth of an inch at the top. If possible never cut the rod, it plays so much better in one piece. A bamboo won't stand splicing—it becomes weak at that point and gives under the strain of a heavy fish. Carry the rod about in a female bamboo, split lengthwise, so as to open in two pieces; knock out the joints, and one or two rods will lie neatly in this light but strong case. Lash it round in three or four places, and the rods inside are perfectly secure. At home hang them up like whips, suspended from the small end. In railways they can be tied to the irons of the foot-board of the carriage, and will thus travel safely and be out of the way. Rods not straight when cut, can be straightened by fire and putting under weights." *

This is the sound practical advice of an experienced fisherman, and to make the rod complete would only require rings to be lapped on, while the reel could be securely fastened on in the same manner. Sir Samuel Baker, when fishing in the Atbara in Central Africa, in 1861, used rods of this description, and as already mentioned, took fish 70 or 80 lbs. weight with them.

Mr. Lord also, in his admirable book on American Forest Travelling, mentions with regard to fishing in wild countries: "I never hamper myself with a fishing rod, but just cut the best stick I can find, and trust to strength of tackle rather than to skill in playing a heavy fish in order to land it." † As he tells us he made use of tackle of the most primitive kind, and yet seems to have secured very successful results;

* *The Rod in India*, by H. S. Thomas, 1873, pp. 18 and 19.
† *At Home in the Wilderness*, by J. K. Lord, 1867, p. 146.

nevertheless if the traveller can do it, of course it is most desirable to proceed well equipped, though a great deal of successful fishing can be done by trailing with hand-lines from boats or rafts, and a rod is by no means essential to success. See for instance the remarks on fishing in Lake Superior, which show what can be done in that way. In large deep lakes and rivers, or in rapidly running streams, a rod is a great convenience, but a good fisherman can get on very well without it. Even fly fishing does remarkably well with a hand-line trailing after a boat. In fishing from banks, among bushes, some kind of rod however will be required, and even in this case a wand of hazel, or some other material cut from the neighbouring thicket, especially when the fish do not run very large, will often answer remarkably well.

Those who do much rod fishing and trolling will find great comfort, and perhaps escape serious inconvenience, by having the butt ends of their rods fitted with india-rubber knobs, as the constant pressure of the hard ends against the groin (this being the position of the rod generally in fishing) become after a time the cause of considerable irritation in the part pressed against;* or the "Tarpon Belt" already noticed may be used.

A very useful American invention for boat fishing is the "Dayton rod rest and holder," made of nickel-plated brass, which is attached to the boat by a screw cramp. Its weight is under half a pound, and it costs about two dollars. It is said to hold a rod for the angler as securely as in the hand,† and as it is usual to employ two rods, one on each side of the boat, when

* See *Handbook of Fishing*, Badminton Library, 1886, Vol. ii., p. 17.

† *Forest and Stream* (American sporting paper) of May 29, 1890.

trailing, a good rod-rest becomes of great service in this sort of fishing. When the joints of rods swell and stick fast it is desirable to bear in mind that an easy and safe way of separating them is by heating the ferrule over the flame of a candle or spirit lamp, until it can be readily detached. Never use violence in these cases. Heat will, we may say, always prove effectual. Immovable joints have occurred to ourselves very many times, and we invariably overcame a difficulty thus in the end, though we admit it sometimes becomes a difficult matter to arrange.

The suggestions as to makeshift fishing rods made of bamboo, are in all respects excellent. These arborescent grasses (for such they are) have all the qualifications that are required for the very best fishing rods. They are generally perfectly straight, and can be had of any size, length, or strength desired. For those who are not acquainted with the bamboo in its growing state we may just remark that bamboos are of very different sizes, according to the variety they belong to. Some never grow larger than mere whip sticks, others grow to 100 and even 120 feet in length, and nearly as large in diameter at the butt as the human body, were it a circle; but in almost all cases the uninjured cane of the bamboos gradually diminishes in size all the way to the very top, much like a fly rod, and its actual end is often as fine as a horse hair, its shaft being beautifully polished and finished all the way up. Some of the larger bamboos however are somewhat deteriorated for this purpose by branches; these would be of a size not suitable for rods, except perhaps a section near the upper end. But of whatever size they may be, all are the work of three or

four months growth during the rainy season. The best rods therefore will obviously be got from old canes that have had abundance of time to harden; so hard do some varieties then become that they turn the edges of knives, etc.

Besides bamboos, however, hazel, and other shrubs, produce straight sticks that make heavy but still very fairly good makeshift rods. All of them require to be treated in the same way: rings have to be bound on at intervals, as upon the rods of the tackle shops. For travellers' use, especially both for sea and tropical waters, brass rings are by far the best. Two sorts must be carried—top rings, and ordinary running rings for the line to go along the length of the rod. For choice, when fitting up a rod in the new, it is always better to have "stand-up" rings. Lapping silk, or flaxen thread, such as is used by sailmakers, is also wanted. In makeshift rods the reel must be bound on like the rings. Clearly however no makeshift rod will ever be so light, handy, and pleasant to use, as one that has been turned out by an artist in manufacture, though a good section of bamboo may go very near to approaching the less highly finished sorts.

What is mainly wanted, however, is a strong, serviceable article, not by any means necessarily a handsome one.

As regards lines, it is desirable to have fishing lines as thin as is compatible with strength. There are of course many "makes" of fishing lines, upon the relative merits of which opinions may differ; probably those known as "American lines" are as strong and good as any. For playing heavy fish, lines of considerable length will be required, say from 150 to 200 yards.

It is strongly recommended to test the strength of all lines before purchasing, and always to have a spare line or two in reserve, in case of accidents.

Also besides the superior class of lines used in rod fishing, it is desirable to have some good strong cod lines, such as are used at sea. They are most useful adjuncts to a traveller's outfit and come in for many purposes, such as hand-lines, night-lines, long-lines, as well as for presents, and form a valuable species of trade goods among people living in the vicinity of great waters.

A few words as regards the care of lines will not be superfluous. Lines left damp for any length of time are sure to become unsound and rotten, especially in the tropics. Therefore, the moment you return from fishing, see that they are thoroughly dried. It should be a rule, always to draw off every part of a line wound upon a reel, that has been exposed to damp, so as to get it all perfectly dried, before it is wound on again. When first winding it on, see that the end is well secured to the reel. Otherwise, should a large fish run it all out, he may break away and carry off the whole line. Make a practice also of occasionally examining into the general condition of every part of a line exposed to wear and tear, and to the action of the water, and as bits at the end next the hook become frayed or unsound, cut them off. Old lines may be made serviceable for some time longer by reversing them upon the reel and so bringing up the unused end into use.

It is desirable to have at least one or two large-sized ones which will hold a line of great length. In rapid waters a large fish, running furiously off downstream, will often carry out a lot of line before he can be

stopped. See that all reels are strongly and perfectly fitted in all their details, but avoid all complicated kinds such as multipliers, and other mechanical winches, which in practice often prove of doubtful utility. Great care should be taken to have reels that cannot what is called "overrun" themselves, when there is a sudden check in the rush of a large fish. For this purpose the line should not draw out too easily, and the moment the strain ceases, the action of the reel should instantly cease also. Every reel of considerable size should have a leather case to preserve it from injury when travelling.

Then as to hooks, an ample assortment of these useful articles, of all the principal sizes, should always form part of a traveller's stores, as really good hooks are not easily obtained in out-of-the-way places; also fish-hooks, especially those of the larger sizes, are always most welcome presents everywhere, and are most useful as a medium of exchange in many countries.

But avoid carrying a lot of lapped hooks—tie on such hooks as may be required for use as they are wanted. Eyed hooks are however now coming more and more into general use, and are a vast improvement upon the old kind, which they will probably eventually supersede altogether. The eyes may be turned up or down, or be needle-eyed, but the best are those with the eyes (or loops) turned down—that is towards the bend, not back from it. The employment of double hooks brazed, especially for the smaller sizes of salmon flies, will be found a great improvement in holding the fish when hooked. *

* *Handbook of Fishing*, of the Badminton Library, Vol. i., pp. 4 and 5.

For flies, the old system of lapping was thoroughly bad. Flies should be tied wholly independent of the gut, or anything connected with the line. The tying of a fly should have absolutely nothing to carry, except its own feathers, as an old fly tied on in the ordinary way will almost always draw, when the wax and lapping become dried up. The gut should be soaked and attached to the eye of the hook when the fly is wanted for use, and until then the fly should remain "unmounted."

In hot damp climates the ordinary blued hooks are apt to rust sadly. Travellers' hooks should therefore always be dipped in some good varnish to preserve them as far as possible from corrosion. It is said that "enamelled rust-proof hooks" however, are manufactured by Messrs. Allcock and Co. of Redditch. * We trust that it may be so, but we are inclined to believe that there are no better or more useful hooks for travellers than tinned sea-hooks, and any sort of hook of course can be tinned. Some fishermen might be disposed to object to them on the score of appearance, but tinned hooks are preferable to rusty hooks, and in many parts of the world all articles of iron or steel rust terribly if long kept in stock, and rusty hooks soon become quite unserviceable.

An assortment of brazed triangle hooks will be wanted for arming spoons, etc. These will have to be carried in boxes to preserve them from injury. The brazing of those sold in shops is often sadly deficient. This will require to be seen to, and should receive special attention. Triangle hooks should never be attached to tackle until wanted for use. Extra strong ones,

* *The Rod in India*, by H. S. Thomas, 1873, p. 242.

specially made for the purpose, are sold for mahseer and other large powerful fish. When packing hooks in this form it is obvious that no pressure should be allowed to come upon them, or the brazing may become fractured; this is the reason why it becomes necessary to carry them in boxes.

Carry as few artificial baits as possible. They are expensive, occupy a lot of space, require special boxes to carry them safely, and many of them are apt soon to get out of order, while very few of them are of much use. In the author's humble opinion these articles seldom prove satisfactory, and nine times out of ten the spoon will prove by far the most killing of all artificial baits. The spoon is the mainstay of the traveller's fishing outfit—carry plenty of them, of assorted sizes, some of heavier material than others; always carry them unmounted, and only fit them up for use as required. A piece of chamois leather and a little "rotten stone," or small box of plate powder, is useful to clean up tarnished spoons.

Next as regards *flies*—many books have been written upon this one item of a fisherman's outfit, it would therefore ill become the author to venture to lay down the law upon a subject concerning which opinions differ so much, as to the question of—"What are the best flies?"

The fact is, many of the flies sold in countless varieties in the fishing tackle shops—especially the salmon flies—represent no known variety of the insect world. The fish therefore probably mistake them for some species of aquatic life, which looks as if it might be good to eat. Almost every country has its own special artificial flies, which are (so we are assured in

the fishing tackle shops) the *only* reliable ones for use in their waters. It may be so, and in that case the angler will do well to try a selection of a few of the most highly recommended. In some countries fish do not take a fly well; that is so in British Columbia for instance. The author has tried many kinds of fly there, but discarded them all for natural bait; but since the invention of the "spoon bait" it has superseded almost everything else. For both salmon, sea and river trout, the author has however found a large self-coloured saffron yellow fly the most generally useful. He used to carry them in assorted sizes for the various sorts of fishing, and has found them do well all over America, and in Norway, Sweden, Russia, and other places. Another good one is like a large black gnat.

For trout, the brilliantly coloured smaller sizes of salmon flies, and white trout flies, all proved useful at times, also some of the standard varieties of English trout flies. For salmon, "Butcher," "Britannia," "Jock Scott," "Silver," and "Black Doctor," all proved serviceable; also some of the gaudy flies used upon the Irish salmon rivers. But on the whole, as a traveller, we could not say that the fly has given satisfaction at all times—very much the reverse.

Gut, wire and gimp also require to be carried; but gut is apt to become dry, brittle, and rotten by long keeping, especially in hot climates. Therefore it is very much more important in these cases to have it thoroughly soaked before use, either for single or twisted gut. The best salmon gut is however very expensive. Mr. Thomas however makes a valuable suggestion as regards an efficient substitute, as we shall see further on.

Gut traces intended for the use of travellers require

special attention. Whether of single or twisted gut, it is in all cases essential that they should have every length *knotted;* never depend upon lappings only—by doing so, probably more fish are lost than from any other cause. Tackle makers may sometimes raise a protest, because traces look a little less neat when knotted than when merely lapped. But those who desire to have reliable tackle should insist upon all gut traces being knotted, no matter what anyone may say to the contrary.

It is also as well to remind anglers that gut traces made up with swivels are very subject to injury, when steel ones are used, if the traces have to be carried about for any length of time, by the rust eating into the gut and rendering it rotten. Consequently brass swivels are in our humble judgment always to be preferred to steel ones, for travellers' use. Personally we can say that we have never known an instance of the fish being lost through the swivel breaking.

Gimp is apt to turn black and stain, if exposed to the influence of damp, and in some waters is said to become rotten very quickly. This was alleged as regards some of the Russian waters; so far as his experience went however, the author did not remark any peculiar effect upon the gimp used by him there.

Cheap and capital substitutes can be made for gimp by using either ordinary copper bell wire, or thin brass snaring wire twisted. A vast improvement upon this, and even upon gut, is however suggested in Mr. Thomas's book. It is inserted here entirely upon Mr. Thomas's authority, as the author of these pages has no personal experience of it himself, though he has been much impressed by the probable value of the idea.

Mr. Thomas says: "I do not believe in gimp in bright Indian waters. I therefore use wire in preference. It is much less visible. Indeed I think it is as hard to see as a single salmon gut. It is not so liable to rot as gut is, it is much cheaper, and with moderate care one trace will last a lifetime. An objection is it rusts, but this is met by laying it up in vaseline when not in use. No wire stands doubling backwards and forwards; therefore avoid haste in straightening, and never try to straighten a kink by forcibly pulling it straight like string. I prefer steel wire. The very fine annealed wire used is No. 28 Birmingham gauge, diameter—·014 inch, breaking weight 17½ lbs; take three lengths and make a twist; if there is a flaw it flies in twisting, also twisted wire is much less liable to kink than untwisted wire. For heavy fish annealed steel wire is far preferable to either gut or gimp, in durability, strength, invisibility, and economy. A treble twist is easily cut by a pair of scissors, and is easily fastened to a swivel, etc. A convenient way of keeping twisted wire is to put each trace into a leather pocket of its own. This prevents its springing out and keeps the vaseline about it, and it comes out next morning unrusted and unkinked." *

These suggestions seem to be admirable in every respect, and there seems to be no reason why a single wire of this kind almost as fine as a hair should not form a cheap and perfect substitute for the best gut. It would probably be not only much stronger, but quite as invisible, and is well worthy of a trial. The liability to injury by rust is the only apparent objection, but even so, it would certainly be far more durable than gut in hot damp climates.

A selection of split rings, swivels, etc., are required for mounting spoons and spinning tackle of all kinds.

* *The Rod in India*, by H. S. Thomas, 2nd edit., 1873, pp. 75—78.

Great complaints have been made as to split rings (similar to miniature key-rings) occasionally proving unreliable and breaking; and should the ring after being put on appear at all stretched beyond its powers, it should of course be rejected as defective. Mr. Thomas however disapproves of these rings altogether, and advises the substitution of brass wire of a little less thickness than the hook, which goes through the eye of the spoon and that of the treble hook or swivel, and is then given three neat turns with the pliers as close to the spoon as possible; by this means rings may be dispensed with. * Or else he suggests that if rings are preferred the spoons should be sent out from the maker mounted with solid soldered rings. This would however merely remove the difficulty one step. If proper care is taken in the selection of these rings however, by testing a few of them when purchasing, there is seldom much danger. They are very convenient for making up tackle quickly, and the author cannot himself say that he ever remembers sustaining losses by the breakage of rings.

Swivels are apt to get jammed by rust if made of steel, and for damp hot climates it is better, as we have said, to have them always of brass; indeed on the whole the brass swivel is every way much the best suited for fishing of all kinds, and a good supply should always be taken, as it is impossible to use spoons etc. without them.

Double swivels, which are an improvement on the old kind, are now made of all sizes up to two or three inches in length.

A supply of tying silks, wax, etc., must not be

* *The Rod in India*, by H. S. Thomas, 1873, pp. 223—4.

omitted. The quality of all these should be well tested by the intending purchaser before buying, to see that they are perfectly sound and evenly twisted.

Cobblers' wax is best carried, whilst travelling, in a piece of chamois leather. Wax for tying is easily made, if necessary, and the following is a good recipe for wax suitable for a fisherman's use: Take of

Best yellow resin 2 ounces, in powder
White bees' wax, sliced fine 1 drachm
Best fresh lard 2½ drachma

Melt the first two together in a small jar, standing in boiling water, then add the lard, let simmer for ten minutes, stirring till well mixed; then pour into a basin of cold water and knead till cold, to give toughness. Make it into small balls and keep it on a piece of window glass in a box, so as to exclude dust. This must be kept in a cellar or cool place. *

For fly-tying where a colourless wax is wanted, the following is recommended:

Resin, very clean, 4 ounces
Diachylon 1 ounce

to be made up in the same manner as the other.

An exellent varnish for rods and tackle is made as follows:

Orange gum shellac 1½ ounces
Gum benzoin ½ ounce
Spirits of wine 3 fluid ounces †

Dissolve, allow it to stand one week before using, or until it is well dissolved. When these things are not to be had, a good useful varnish used by the author was made by simply dissolving common sealing wax

* *The Practical Fisherman*, by J. H. Keane.
† *Ibid.*

in spirits, to a proper consistency—black wax is perhaps the most convenient colour; a little put over tyings with a feather is a great preservative.

Nets for taking fish in lakes and streams, though not a very sporting style of angling, often prove of the highest value to travellers in wild countries, as they can be set in the evening and left to do their work while the party is at rest. There are two useful kinds of nets, one with a large mesh for catching full-sized fish, and the other with a fine mesh for small fish, which come in useful for bait and other purposes. A net of this latter kind set at the outfall of a small stream where it joins a lake or large river, will often do good work in this way. In the Hudson Bay Territory, in the olden day, all parties of voyageurs on the great rivers and trade routes were provided with nets, and at most of the Hudson Bay forts the supply of fish at all seasons proved a most important item. At many of these places a plentiful supply of nets were a necessary article of store, as the well-known "white fish" (*Coregonus Albus*) of itself alone furnished the residents in many cases with an inexhaustible supply of excellent food, when the migratory game birds and animals had moved off to other regions. *

Nets are always "engines" (as the game laws call them) of the utmost service, wherever permanent waters of considerable size exist. They require of course to

* See *Narrative of an Arctic Land Expedition to the Great Fish River and along the Shores of the Arctic Ocean*, 1833—1835, by Captain Back, published 1836, Vol. i., p. 519.—Captain Back goes so far as to say that it is through the abundant supply yielded by the fisheries of this one celebrated fish (which is found in every piece of fresh water between Lake Erie and the Arctic Sea) that the fur trade is carried on.

be fitted with proper "floats" to keep the net at the surface or extended in proper form, even if sunk below it. Cork will naturally form the best kind of float, but it is not at all necessary. Dry wood, of any light kind of timber that swims well on water, answers the purpose almost equally well. The wood of the alder is one of the best for this purpose.

It absorbs water less, if the floats before use are somewhat charred in the fire, after being dressed into form; they require to have a hole for the line pierced through their centre, lengthwise. It is not necessary to have sinkers attached to the lower edge of the net in still water such as lakes. If however there is a current, of course suitable leads should be put on to prevent the net rising. When set, a net should form a wall, as nearly as possible vertical, against which a fish should strike without being aware of its presence. The twine therefore of which it is constructed should be as thin as is consistent with sufficient strength, and spare hanks of it should be carried, together with mesh sticks and needles, for mending breakages, which it is important to have looked to as soon as possible. Twine for making nets should always be tanned, to preserve it from the water.* It takes a good net-maker to mend holes neatly, but the art of net-making is not of itself an art difficult to acquire, and travellers who are likely to use nets would do well to get a few

* Nets, lines, etc., of fishermen can be tanned as follows:

Catechu bark bruised ½ lb.
Sulphurate of copper ½ ounce
Hot water 1 gallon

Boil till the copper is dissolved, remove from the fire to cool, and steep the article to be tanned in the solution for twenty-four hours. Afterwards wash them in fresh water and dry (*Sea Fishing*, by John Bickerdyke, Badminton Library, 1895, p. 217).

lessons, before leaving home, upon the subject of net-making and repairing, from a practical net-maker.

Even the closing up of great waters by ice by no means puts a stop to the setting of nets or line fishing, and in the Hudson Bay Territory for example some of the most valuable fishing of the year is carried on during the winter. Holes of course have to be cut in the ice, and it frequently occurs that numbers of fish are attracted to these holes, probably by the light, when excellent fishing is often obtained by the native Indians, who follow this sort of fishing. Small fish coming to the air-hole are thus caught in large numbers. When the line is let down, either to the bottom or to considerable depths, one man can watch several holes, the lines being made fast to a cross stick of wood, so placed that when a fish gets on, its tugging at the line causes a small flag or other signal to turn up, and announce the capture to the fisherman. The setting of nets beneath the ice is a process that requires an experienced hand. The method employed in the Hudson Bay Territory is thus described by Sir John Richardson:

"The first step is to make a line of holes about fifteen feet apart; a pole is introduced along the surface of the water, carrying a line, which hauls in a string of nets properly buoyed and loaded, but seldom exceeding five in number. The rope is then detached and each end of the net fastened to a piece of wood, laid across the respective holes. Next day the (end) holes are opened, the rope attached at one end and veered away as the nets are withdrawn at the opposite hole. The fish being removed, the nets are drawn back to their places by the line. A line of nets reaches about 400 yards, and the fishermen generally endeavour to carry it entirely across a strait or pass in the lake which fish

are known to frequent. Every second or third day the nets are taken out to dry and repair." *

This gives a very good idea of the way fishing is carried on throughout the winter in the great northern wilderness of British America at the Hudson Bay Co.'s forts, and elsewhere.

In some of these northern waters the native Indian tribes were very clever in the use of fish spears at holes cut in the ice, as also were some of the white settlers. Ice fishing may not appear to be very lively sport, but may at times prove of extreme importance, in getting food supplies during winter in the northern wilderness, a great part of which, it is not too much to say, would be quite uninhabitable, were it not for the fish and fisheries. As the cold gets very intense, the fish go out away from land into the deep water, and sometimes the very best ice fishing is obtained in the severest weather. †

When snow covers the ice, as it always does to a considerable depth under normal circumstances in these regions, the water beneath it is of course then buried in profound darkness; when therefore a window is cut through the ice in the form of a hole, it is easy to understand that the light will prove a powerful source of attraction to fish, swarms of which come to the spot, when a bit of stick and a yard of string will be enough to make a rod and line sufficient to capture great numbers. Bits of fish make the best baits on these occasions. An ice chisel must be carried to

* *Boat Voyage through Rupert's Land*, by Sir John Richardson, in 1848—49, Vol. ii., p. 80, published 1851.

† See "Observations on Ice Fishing" in *The Emigrant and Sportsman in Canada*, by John J. Rowan, 1876, pp. 300—301.

make the holes, and a small hole once made can rapidly be enlarged to any size with a saw.

The importance of night-lines for travelling parties will also be obvious. Many an excellent breakfast of fish is caught in this way with a minimum of trouble. The best form of night-line is like a small sea "trot" or long-line, with droppers and hooks attached at intervals upon the main line. This can be set in large waters by a stone attached to each end; a cord and small rush float attached to one end shows where it lies, and serves to pull up the line in default of a grapnell. Bits of meat, liver, or fish, and entrails of birds, etc., make the bait—or worms, if they can be had. In some waters large trout and eels are caught in this way; we have ourselves pulled up lines of this kind, when nearly every hook had a fish on it. In small rivers the ends of such lines can be made fast to opposite banks. The current then carries the hooks free and maintains them at whatever depth is considered best. It is sometimes better not to let the baits touch bottom. While the traveller is sleeping these lines will be at work, and often a good breakfast of fish will be found awaiting his attention in the morning.

VALEDICTORY REMARKS.

This brings us to the conclusion of the work we had laid out for ourselves, which we now respectfully present to the notice of the public. The measure of success which we may have achieved in the discussion of a very wide range of subjects we shall leave to our readers to determine. All that we shall venture to say in

committing these volumes to the press is, that we have spared neither time nor trouble in investigating the various points with which we have attempted to deal, and when we have advanced theories of our own, they have been originated, we can faithfully say, not upon hastily drawn conclusions, but after much anxious study and thought.

A good many facts which we have brought under review, we venture to think, are however not to be found in any printed books heretofore existing; that is to say, during researches spread over a period of several years of continuous literary labour, we have been unable to find any mention of them in the works of other authors; whilst others again have been so lightly touched upon by those writers who have noticed them at all, that we have been unable to make any useful extracts from their remarks.

It would be too much to suppose that our views will receive in all cases general acceptance without demur. No one can be more sensible than we ourselves are, how liable the human judgment always is to fall into error. All therefore that we desire is, that the arguments we may have advanced in support of facts, may receive impartial hearing and consideration. It can do no harm to once more remind the reader that our constant object has been to picture Nature, as we humbly conceive she existed before the face of the wilderness had been transformed by external agencies into an unrecognisable image of its original self. Such are the reasons which have prompted us in the selection of the title given to our work.

Everywhere, we venture to believe, Nature is continually employed in writing her own biography. The

workings of human agency are merely ephemeral, and make no organic change in any of the conditions natural to a country that will continue permanent where they have ceased to operate. See how much the agricultural land of England has reverted towards its original condition the moment that the farming industry failed through temporary stress of the times: so that it is calculated that it will take years to restore it to the condition in which it was before the depression began to operate.

These things show that Nature still holds on the even tenor of her way, altogether uninfluenced, except for the moment, by anything that human labour may effect. No! if we wish to understand Nature we must study her in her *wild*, and not merely in her civilized, or in other words in her artificial state. But in saying so we in no way desire to cast a reflection upon the enormous value of the study of the modifications which human skill and culture may introduce into the natural products of a country. He that causes two blades of grass to grow where but one grew before, still remains a benefactor of the human race. That however does not affect the gist of our argument that the Book of Nature deserves *also* to be studied in its orginal, as well as in its transformed condition.

Now the great book of Nature is open to all. Through its medium, as we humbly venture to believe, the Great Creator may be regarded as continually speaking to mankind. Even as a mother holds up a picture-book before her child, so this great book is freely displayed by our bountiful mother, Nature, without reservation and without price, to all who desire to profit by it, in order to explain and to instruct, so that it thus

forms a series of object lessons to students of every age and nationality.

These views have absolutely no claim to admiration or attention on the score of novelty. From time immemorial the same thoughts have been present to men's minds, and from time to time a few have published their opinions on the subject for the benefit of posterity. Somewhat more than a century ago, for instance, Thomas Paine wrote as follows about it. We quote selections from his remarks, not at all because we agree with the "advanced" opinions of the author of "The Age of Reason" (except in so far as we have quoted from them), but because his words descending to us from a former age still appear to be deserving of repetition long after their writer has passed out of public recollection. Great words very often survive the reputations of those that wrote them; and so may it always be.

"This is the word" (says Paine, speaking of the Great Book of Nature) "which no human invention can counterfeit or alter, that is speaking universally to man. The Creation speaketh an universal language, independently of human speech. It cannot be forged; it cannot be lost; it publishes itself from one end of the earth to another; it preaches to all Nations, and to all worlds." * "The Almighty lecturer by displaying the principles of science in the structure of the Universe, has invited man to study and imitation. † And, he goes on to say (with respect to a question which is still agitating men's minds) "since no part of our earth is left unoccupied, why is it to be supposed that the immensity of space is a naked void, lying in eternal waste? § "The creation which

* *The Age of Reason*, by Thomas Paine, Pamphlet published in Paris 1794, Part i., pp. 22 and 23.

† *Ibid.*, p. 30.

§ *Ibid.*, p. 41.

we behold is the real, the ever-existing word of God; it proclaimeth His power; it demonstrates His wisdom; it manifests His goodness and beneficence." *

[Thomas Paine, born 1736 at Thetford, Norfolk, was originally a Quaker. He was the author of many political books and pamphlets, and was generally one of the best abused men of his time, in consequence of his extreme opinions. Finding his own country too hot to hold him he emigrated to America, and held various offices under the American Government during and after the War of Independence. Later on he went to France, where on account of his revolutionary opinions he was elected a member of the National Convention in 1793, when he voted *against* the execution of King Louis XVI. † He was afterwards imprisoned, and wrote portions of his "Age of Reason" while in prison. He was generally admitted to be one of the ablest thinkers of his time, but his aggressive policy in ventilating his opinions was continually getting him into trouble, and upon leaving France (where he escaped the guillotine during the Reign of Terror by the merest accident, through the prison-warder omitting to mark his cell-door with chalk as one of the day's victims) he returned to America, where he died in 1809].

* *The Age of Reason*, by Thomas Paine, Pamphlet published in 1794, Part i, p. 55.

† See *The National Dictionary of Biography*, edited by Sidney Lee, Vol. xliii., p. 75, published 1895 (Article "Thomas Paine").

THE END.

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